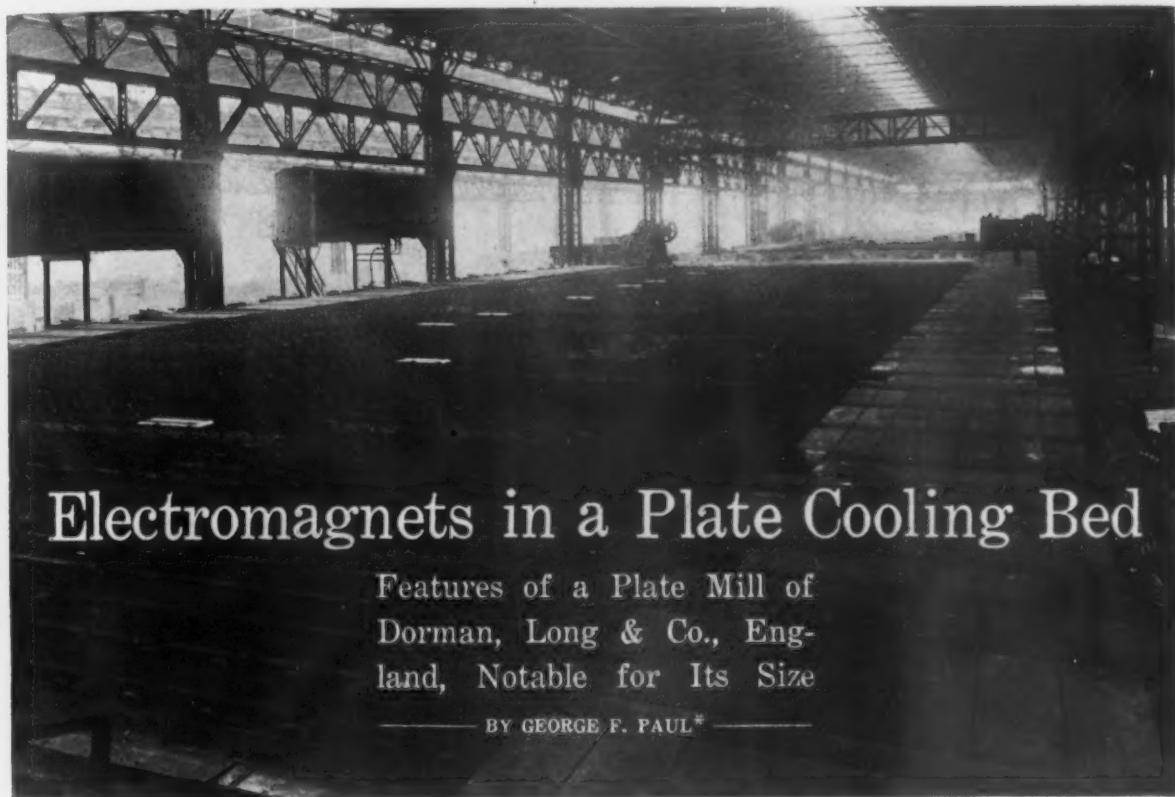


# THE IRON AGE

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## Electromagnets in a Plate Cooling Bed

Features of a Plate Mill of  
Dorman, Long & Co., Eng-  
land, Notable for Its Size

BY GEORGE F. PAUL\*

A UNIQUE method of handling the plates on the cooling bed, which is done by means of electro-magnetic skids is a feature of an electrically driven rolling mill at Redcar, England, notable otherwise for its size. The improved means for transferring and handling rolled steel plates on cooling banks is a patent obtained by an official of the company, L. Ennis, general manager for Dorman, Long & Co., Middlesborough, England.

The plates are delivered by live rolls to this plate-handling table at the end of the cooling banks and delivered for side shearing to side shears. The table installed in the Dorman-Long mills, is the first of its kind to be built and is giving highly satisfactory results. In a single shaft of 8 hr., 145 tons of sheared plates have been handled by the machine.

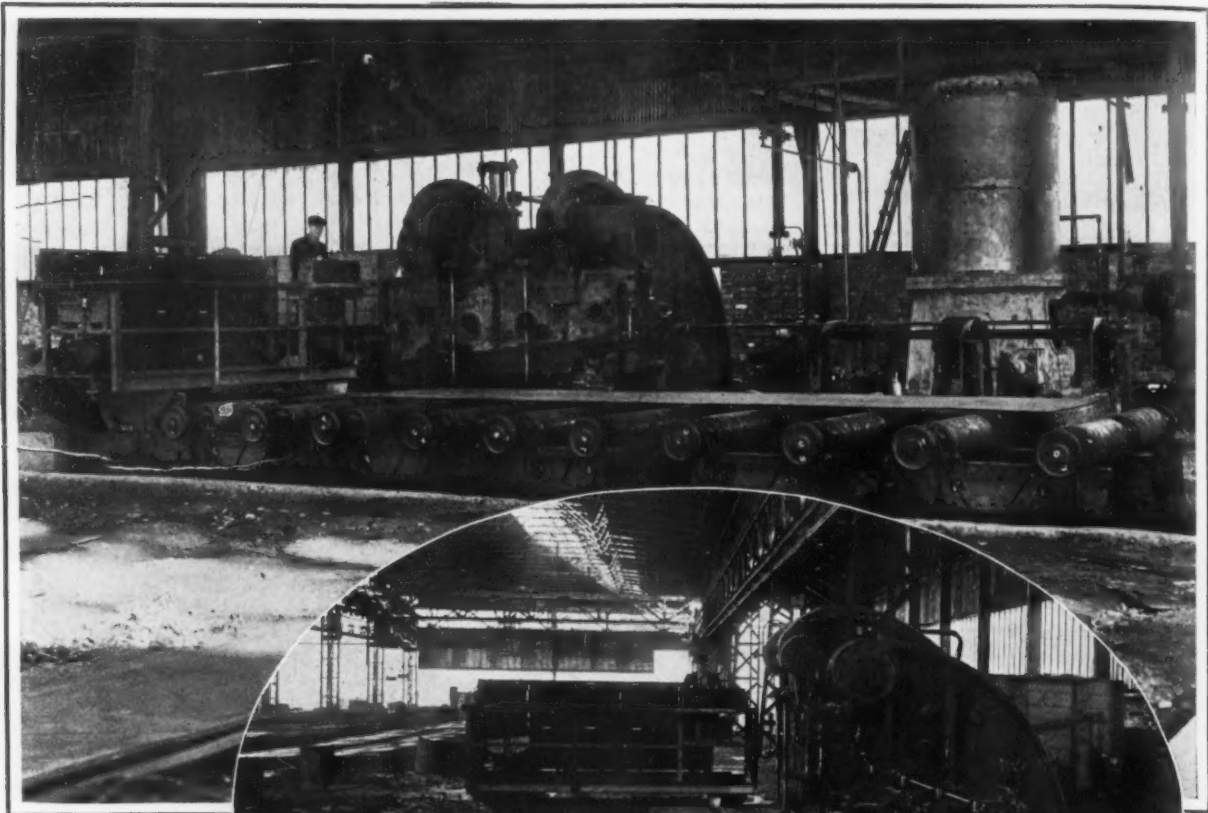
The method is as follows: After the plates leave the finishing rolls they are conveyed by roller track to shears for end shearing and cutting to length. The side shearing of the plates is carried out at two sets of shears, part of the output being dealt with by a set of shears having castors, while the rest of the output is delivered to shears fitted with the plate operating table, and the plates for the latter are conveyed in a straight line from the end shears by roller gear to the end of the cooling banks where they are received by the operating table. The rolls on the operating table are on the same level as the mill roller track. The plate is then adjusted by means of the electro magnets

fitted between the rollers on the table and put up to the side shears. The alinement is quickly and accurately carried out by the table operator from the switchboard during the actual operations of shearing. The plate is held in correct alinement by the magnets under the plate. One side of the plate is thus sheared.

Then the plate is turned for the shearing of the other side. The machine is fitted with two sets of separately driven rollers. The plate is rotated by revolving the rollers in opposite directions; this is a very simple operation, the plate being kept under perfect control by means of the magnets, and without the slightest difficulty the unsheared side of the plate is thus presented to the shears and the shearing is completed by a repetition of the first operation already described. By this means a great saving in labor is effected. With the use of the table only three persons are needed; namely, one man on the table, another to operate the shears and a third to remove the shearings.

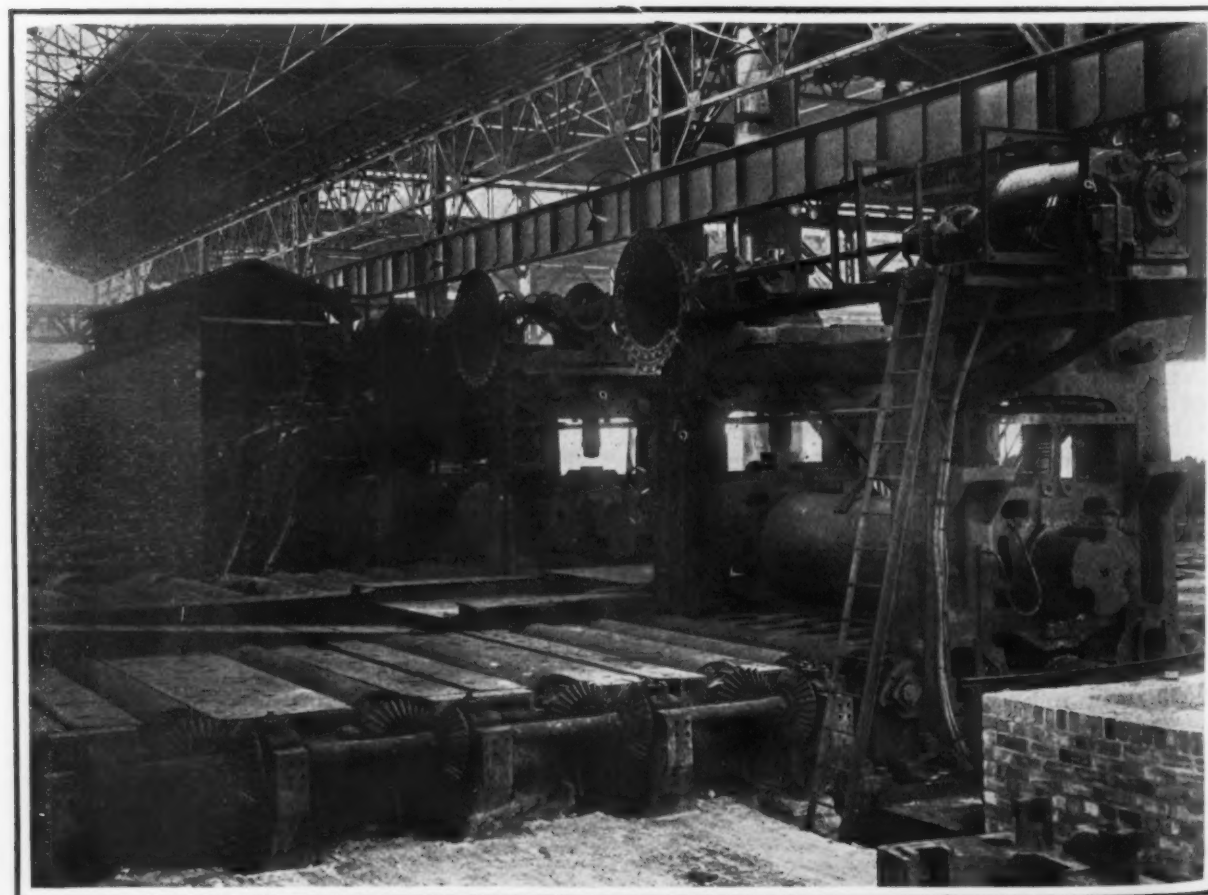
The 9 ft. 6 in. electrically driven reversing plate mill consists of two stands of 42-in. diameter rolls. This mill is capable of rolling plate from  $\frac{1}{4}$  in. to 2 in. thick and up to 9 ft. in width and any length up to 100 ft. A special feature of this mill is the motor for driving, which has a maximum peak load of 20,500 h.p. when running at 40 r.p.m. The speed can be increased up to 70 r.p.m. by weakening the motor field. The machine is designed to be reversed from 40 r.p.m. in one direction to 40 revolutions in the opposite direction in less than 3 sec.

\*264 Ellsworth Building, Chicago.



Special Plate Handling Table at Shears in Plant of Dorman, Long & Co., Redcar, England.

Below Is the Electrically Driven Reversing Plate Mill Consisting of Two Stands of 42-In. Diameter Rolls.



The flywheel of the motor generator is composed of two separate 30-ton wheels mounted side by side on the same shaft. Each of the wheels is built in three parts consisting of a central disk and two rims that are riveted to the central disk. The stored

energy in the flywheel when running at 600 r.p.m. is 46,900 ft.-tons and the available energy that the flywheel is capable of giving out while decreasing in speed from 600 to 500 revolutions is approximately 85,000 hp.-sec.

## Trent Process for Cleaning Powdered Coal

### Agitation Method of Producing an Amalgam and Eliminating Ash from Low-Grade Fuels

—BY O. P. HOOD\*

**D**URING the war certain suggestions concerning power production were made by Walter E. Trent to the War Inventions Board and, at the request of the War Department, facilities for experimental work were provided on the grounds of the Bureau of Standards. The experiments were along the line of controlling the conditions of combustion in a closed space. In order to reduce slag troubles, experiments were carried out for removing ash from powdered coal. After the war, work along this line was continued, resulting in the Trent process, which agitates or beats together powdered coal, water and oil.

A new technology had previously been given to ore preparation by the use of small quantities of oil in water with froth flotation, and although the methods, results and mixtures of the Trent process were quite different, yet the same physical phenomena of differential wetting was used, and the possibility of there being interesting results in fuel technology was evident. A co-operative agreement was entered into, whereby the Bureau of Mines was to investigate the underlying physical and chemical facts and make them public, and the Trent Corporation was to pay the cost of the investigation.

The several reports as made have been available to any one interested, and are now to be published. While the Bureau of Mines felt justified in investigating the physical phenomena so far as might be done in a laboratory, and so far as public interest might reach, no attempt was made to discover the commercial possibilities which development might bring. The question of commercial possibilities must be left for commercial enterprise to answer.

#### What the Process Is and Does

Briefly, the process consists in agitating together powdered coal, water and oil. This produces a partly de-ashed plastic fuel, called an amalgam, the oil selecting the coal particles and largely excluding the water and ash. The amalgam can be freed from water mechanically held by working, much the same as butter is worked. The amalgam can be burned in several ways; for example, it may be shoveled, or forced through pipes by pressure; it can also be stored, under water if desired.

The laboratory results immediately suggest many interesting possible applications. For pulverizing fuel, wet grinding presents many advantages over dry grinding, provided the water can be eliminated afterwards. To be able to reduce the ash in coal may make available great quantities of low-grade coals and material now considered as waste at the mines.

If an oil is used which can be distilled at a temperature below the distilling temperature of the coal, powdered fuel is reclaimed from the amalgam and the oil may be reused. If a heavy oil be used and distilled to dryness, a coke product may be recovered, although the coal used may have had no coking quality. If the distillation proceed only to a heavy pitch, a mass suitable for briquetting may be made. In distilling oil mixed with a finely powdered material, the distillates are similar to those obtained by distilling under pressure, so that the distillation of an amalgam

of coal and oil gives quantities often more favorable than the sum of the separate distillations of the coal and the oil.

The amalgam can be used for a gas-making fuel, and gas-house tar emulsions can be dehydrated by mixing with powdered coal, the amalgam being retorted for further gas making. Graphite ore can be separated from its gangue, and coke can be separated from flue dust, by using the Trent process. Clean coal in anthracite sludge will make an amalgam if oil is added.

A paper by G. St. J. Perrott and S. P. Kinney, of the Bureau of Mines, has presented the results of the laboratory-scale tests of the efficiency of the Trent process in cleaning coal. A noteworthy feature of the operation of the process is the cleanness of separation of mineral matter from combustible matter. Combustible recovery has averaged better than 95 per cent. High ash reduction has been obtained with the bituminous coals and anthracites. Sulphur reduction has been good in the case of anthracites but poor with the bituminous coals.

It has not been found feasible to treat the lignites without preliminary carbonization, due to the difficulty of forming a coherent agglomerate of the raw lignite and oil. Finer pulverization than 200 mesh does not give a sufficient increase in ash reduction with most coals to warrant the added expense of the longer period of grinding. Any oil whose viscosity is not too great may be employed in the process. Oil losses in the refuse or water are apparently negligible.

This brief sketch of possibilities revealed by small-scale laboratory work shows that the field for investigation and development is large. The general results show that real benefits are physically possible by treating coal in this manner. The Bureau has interested itself more particularly in the ash separation phenomena or the cleaning of coal, and in the distillation of the amalgam, which will be discussed in a future article.

#### Apply for Charter for Temple Furnace Co.

Noteholders of the Seaboard Steel & Manganese Co., who recently bid in the furnace of that company at Temple, Pa., have applied for a Pennsylvania charter under the name of Temple Furnace Co. This action was taken in order that there may be a formal corporate body to which title to the furnace may pass in the event of the confirmation by the United States Court of the receivers' sale.

First steps to stage a large exhibition of steel products and those of allied industries in the Pittsburgh district were taken at a recent meeting of the general committee of the Pittsburgh Chapter, American Steel Treating Society. The exposition, the only one of its kind in America, will be held in Motor Square Garden, Pittsburgh, in August or September, 1922, when the national convention of the association will convene in Pittsburgh. Dr. C. M. Johnson, president of the Pittsburgh chapter, M. B. Hoffman and D. W. McDowell were chosen delegates to the 1921 national convention at Indianapolis, Sept. 19 to 26.

\*Chief mechanical engineer, Bureau of Mines.



### Double Back-Geared Engine Lathe

A 22-in. and a 24-in., 3-step cone, double back-geared engine lathe have been added to the line of the Lehmann Machine Co., St. Louis. The makers state that in design the aim has been to include liberality of dimension without exaggeration and to include the most approved features, using best materials in every detail.

The bed has chilled ways and is deep and wide. The cross section at end of bed is cut away to permit overhang to the tailstock or placing the steady rest at the extreme end. The inside front way is flat and a rack is cast in the center of the bed for engaging the pawl on the tailstock. The headstock casting is carried from front to rear boxes on a line with center of the spindle, tying the bearings rigidly together and protecting the operator from the belt. Nine spindle speeds are provided.

The tailstock is clamped to the bed by four bolts brought up to the top of the barrel. The spindle is provided with a new and improved device for locking consisting of a heavy floating plug set in a bearing below

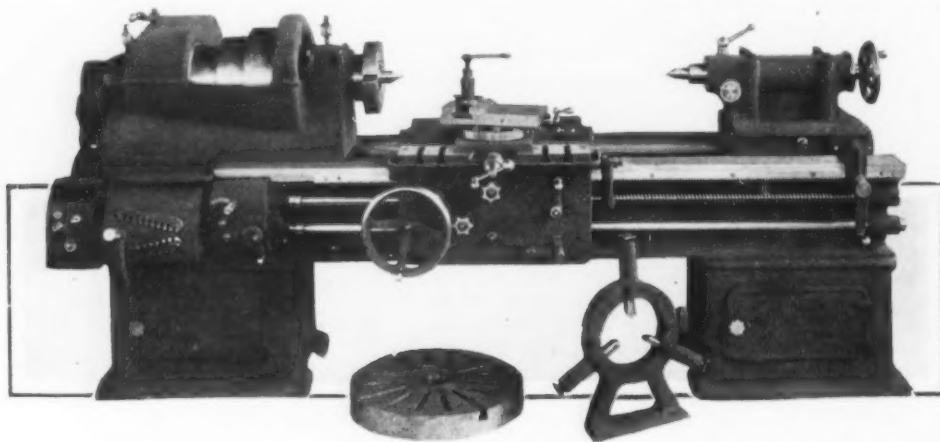
the use of special and compound gears. A central oiling system lubricates the bearings in the quick-change gear box and rocker.

The feed rod does not run when thread cutting and the lead screw is inoperative when the feed rod is employed. The lead screw is of high carbon steel with a 2 pitch Acme thread and has ball thrust bearings at both ends. A thread indicator attached to the carriage can be disengaged when not in use and a micrometer carriage stop can be furnished when desired. The steady rest has alloy steel plugs and all adjustments and locking, except to the bed, are accomplished by means of star handles. It can be reversed on the bed. The weight on skids is given as 7500 lb. and 7800 lb. for the 22-in. and 24-in. sizes respectively.

### Metal Trades Exhibition in Indianapolis

Metal trade manufacturers in Indianapolis are planning to take part in the Indianapolis Industrial Exposition to be held Oct. 10 to 15 at the Indiana State Fair Grounds, under the auspices of the Indianapolis

In the Quick Change Mechanism the Range Is Doubled with the Addition of Only Two Gears



the spindle. The plug is concaved to match the spindle and rests at one end on a shoulder of larger diameter, the other end extending beyond the back of the tailstock casting and fitting into an eyebolt suspended by an overhanging lug. The locking handle sets above this and is threaded to the eyebolt. Movement of the handle draws the plug against the bottom of the spindle, a very light pressure securely locking the spindle. A handle is provided for moving the tailstock on the bed by a pinion engaging a feed rack.

The apron has a central oiling system and is tongued and grooved to the carriage. The front plate is removable leaving the mechanism easily accessible. The lead screw and feed rod have bearings in the apron to prevent sagging and undue wear on the half nut and reverse gears. A safety device prevents engagements of feed rod and lead screw at the same time and link connections are provided to the parts of the half nut. The half nut operating the handle has an easy motion, its leverage being slight at the beginning, preventing injury on the top or edges of the thread. As the nut is thrown in further the leverage increases till at the finish the two halves of the nut are locked in position and cannot be spread apart by any internal pressure. The compound rest is graduated up to 90 deg. and is held to the bottom side by bolts placed at a large radius from the center.

The quick change mechanism is designed for simplicity and doubles the range with the addition of only two gears. A cone of gears with sliding rocker arm is employed, the rocker having two central driving gears of different ratios, each with an intermediate which engage the cone of gears. By dropping the rocker arm and sliding it on the rocker shaft one of the intermediates is thrown into mesh and by raising the rocker the other intermediate is thrown into use and the next progressive set of changes are obtained. Thus all changes commonly used are made by a movement of the rocker arm alone. For uncommonly fine or coarse threads or feeds another handle is used. For cutting odd threads and worms a swinging quadrant permits

Chamber of Commerce. The convention of the National Purchasing Agents' Association will be held the same week in Indianapolis.

Space has been taken by some 400 of the 781 different lines of manufacturing in Indianapolis. One of the features of the Exposition will be that the huge Manufacturers' Building will be laid out in replica of the retail district of Indianapolis, with the world-famed Soldiers' and Sailors' Monument towering in the center of the network of streets named after those in downtown Indianapolis.

### Gain in Pittsburgh Industries

Pittsburgh in 1920 had 2253 industries reporting to the Pennsylvania Department of Internal Affairs. In 1919 reports were received from 1775. The industries last year gave employment to 118,954 persons and in 1919 to 90,254. The persons employed in the city last year in industry included 107,922 males and 11,032 females. There were paid a total wage of \$210,224,110, as compared with \$117,602,200 in 1919. The capital invested in the industries of the city last year amounted to \$469,286,200, against \$354,042,800 in 1919. Industrial products turned out in the city last year were valued at \$889,531,900, an increase of 47.6 per cent over 1919, when the value was \$602,582,800. Pittsburgh's metal products were worth \$536,359,300.

### New Standard Samples

A new standard sample of lead-base bearing metal No. 53 is now being issued by the Bureau of Standards with a provisional certificate. This sample has the approximate composition: lead 79 per cent, tin 11 per cent and antimony 10 per cent, and contains in addition small amounts of bismuth, copper, iron and arsenic. The price of this sample is \$2 per 150 grams, prepaid or parcel post C.O.D.

Renewal No. 33a of nickel steel No. 33 is also ready for distribution at the price of \$2.50 per 150 grams.



# Analysis of Costs of Drop-Forging

Comparison of Steam and Board Drop Hammers  
—Rate of Production Studied as Well as Costs  
—Dividing Line Established Between Types

—BY R. T. HERDEGEN\*

IN every manufacturing line one finds differences of opinion regarding the relative merits of different machines or methods for accomplishing a given result. In the drop forging industry one of the most controversial points is the relative merits of steam drop hammers and board drop hammers. In considering the relative merits of these two types of machinery the main point in the final analysis is, which will produce forgings the more cheaply, assuming of course that satisfactory forgings will be produced in either case?

It is generally accepted that for very small work a board hammer is the more feasible unit, while for very large work the steam hammer is the better. The difficulty is to locate properly the dividing line between the two types. It is also true that certain jobs which can readily be made in a steam hammer cannot, due to their peculiar shape, be made satisfactorily in a board hammer; the converse is not true.

## Definite Sizes of Hammers Compared

In this paper we will consider a 1500-lb. steam hammer vs. a 1600-lb. board hammer. In a few instances a job which can be handled satisfactorily in a 1500-lb. steam hammer may require a 2000-lb. board hammer, but as the difference in the investment and running expenses between the 1600-lb. and the 2000-lb. board hammer equipment is not great we will use the former for comparison. Usually a job that requires a 2500-lb. steam hammer would require about a 4000-lb.

have board hammers. The problem is whether, for most of the 1500-lb. class of work—which is liable to be the bulk of the work of most forging companies—board hammers or steam hammers should be used.

## Relative Hourly and Monthly Output of the Two Types

It is particularly difficult to convince the average shop man that the board hammer can produce as much work per hour as the steam hammer. The writer has found, however, after a very thorough study involving the forging of millions of pieces, such as connecting rods, pedals, gears, spring hangers, spindles and other common forgings, that the production results obtained from the two classes of equipment show the average output per hour in the steam hammer ran 70 pieces against an average of 80 pieces per hour in the case of the board hammer.

A comparison based on the production per month is even more favorable to the board hammer, due to the fact that shut-downs, necessitated by break-downs, are of much shorter duration in the case of the board hammer than they are in the case of the steam hammer. This means that one can expect more actual monthly hours of operation from a board hammer than from the corresponding steam hammer.

Average steam hammer shop men will not believe that the board hammer production will exceed the steam hammer production, due to the fact that if they have any board hammers they are usually tucked away somewhere in a corner. One may consider it axiomatic

COMPARATIVE HAMMER-HOUR RATES

		Hourly Rates—	
		1500 Lb. Steam	1600 Lb. Board
A. Charges based on weight of output. Basis, 275 lb. per hr.	1. Material handling—unloading and piling stock, shop trucking, shipping, scrap handling and overhead.....	\$1.05	\$1.05
	2. Inspection—Hot and cold.....	.35	.35
	3. Interest on rough stock inventory.....	.15	.15
B. Charges involved in heating stock.	1. Fuel oil at 6c. per U. S. gal. delivered.....	.60	.60
	2. Furnace air—Steam turbine with proportionate coal, boiler charges and overhead.....	.30	.30
	3. Furnace repairs—Labor and material.....	.25	.25
C. Charges involving number and wages of men on hammer.	1. Foremen and timekeepers.....	.20	.20
	2. Compensation insurance, safety and personnel.....	.20	.20
D. Charges involving cost of steam to operate steam hammer and electric power to operate board hammer and presses.	1. Coal at \$5.60 per ton delivered.....	1.30	
	2. Proportionate boiler room charges and overhead.....	1.70	
	3. Electric power at 2c. per kw. hr. and overhead.....	.05	.40
E. Charges incurred in operation of machinery.	1. Upkeep, hammer and press—Labor charges.....	.60	.25
	2. Upkeep, hammer and press—Repair purchases.....	.70	.35
F. Charges based on investment.	1. Upkeep buildings, grounds and equipment.....	.25	.15
	2. Depreciation buildings, equipment and machinery—Insurance and taxes.....	.70	.50
	3. Administrative, general office, sales and commercial expense.....	.60	.50
G. Die charges.		\$9.00	\$5.25
	1. Die blocks, die labor and overhead.....	3.00	2.00
		\$12.00	\$7.25

board hammer. There would be no object in using a board hammer for most jobs of this size, for the investment would probably be about the same; and the production might very likely be less in the larger board hammers than in the smaller steam hammer.

It would appear, therefore, that for work requiring a 2500-lb. steam hammer or heavier, it is desirable to have steam hammers. For work requiring less than a 1500-lb. steam hammer it is admittedly desirable to

that board hammers give satisfaction only when they are removed from the vicinity of the steam hammers, and when they have a separate foreman and a separate repair gang, and are otherwise completely segregated from the steam hammers. When this geographical separation is accomplished, then and then only will one obtain really comparable results.

## Three Factors of Cost Involved in Study

In figuring the cost of a forging, there are three factors to be considered: viz: material, labor and overhead.

\*Dominion Forge & Stamping Co., Walkerville, Ont. Paper presented before American Drop Forge Association at Chicago, June 22.

We will of course assume that the same weight of steel is required for a job, whether it is made in a steam hammer or in a board hammer. The same piece work rate should be paid for a given piece, whether it is run in a steam hammer or a board hammer. We will, therefore, assume that the productive or directly chargeable labor per piece is the same in both cases.

It is evident, inasmuch as the material and labor costs for a given forging are the same, whether it is made in a steam hammer or a board hammer, that the only difference will be in the overhead cost. The only method of computing this cost, which will give a correct basis for comparison, is the machine rate system. Any conclusion reached from a comparison of these overhead costs obtained by the percentage system would be incorrect and misleading.

#### Assumption of Equality in Hourly Productivity

Although results obtained from a test involving the making of ten million pieces clearly demonstrate the superiority of board hammers in production, we will assume the production per hour to be the same in both cases. If the machine rates were the same for both classes of equipment, the entire manufacturing cost of a forging would therefore be the same, whether it was made in a board hammer or a steam hammer. To solve the problem correctly it is therefore necessary to determine the hourly machine rate for each class of equipment.

In determining the machine rate, consider a production center consisting of the hammer with a press and furnace. The main units will be a 1500-lb. steam hammer in the one case and a 1600-lb. board hammer in the other. We will use a 55½ Toledo geared press and a furnace with a 36-in. opening, with each hammer. Due to the fact that a steam hammer is a unit requiring considerable heavy dismantling, it should be placed in a building equipped with an overhead crane, whereas, in the case of the board hammer, a building having proper arrangements for a chain fall is all that is necessary. This means that the cost of the building per sq. ft. is greater for the steam hammer than for the board hammer shop. A complete analysis of the comparative hammer-hour rates for these two production centers follows:

In tabulating these hammer-hour rates the various charges have been segregated into seven main groups. In the first three groups the hourly charges are the same for both types of production centers, because the production per hour is considered the same for both types of hammer and because it is customary to pay the same piece price for a forging, whether it is made under a steam hammer or a board hammer.

It will be noted in the above tabulation that the phrase "and overhead" has been added in several instances. This is possible, because the actual overhead has been determined for such non-productive departments as the material-handling department, the oil tanks and furnace equipment, the boiler room, and the electrical department. It is very necessary that this be done, particularly in the case of the boiler room, for if this department's depreciation and other overhead expenses are charged to the general plant account, instead of being segregated against the boiler room, machinery which has no connection whatsoever with the boiler room will be charged with a large overhead resulting from boiler operation.

#### Power Charges for the Two Hammers

Charges under group "D" represent the cost of producing steam for the steam hammer and electric power for the board hammer. The electric power charged to the steam hammer is the cost of the amount required to run the trimming press. It might appear that the boiler room overhead charges are heavy, but a careful analysis of any boiler plant will show that the investment is great, with a resultant large depreciation charge, and that such costs, together with items of repairs and labor, are much higher per hour of operation than is usually estimated, particularly when the plant is running only one shift.

Charges under group "E" are those incidental to keeping the equipment in operation. The cost of oper-

ating the steam hammer is much greater than the cost of operating the board hammer, due to the fact that the actual breakage and the cost of dismantling and reassembling hammers after break-downs are more in the case of the steam unit. These figures are based on data collected over several years, and should not vary much in different plants, providing that the equipment is kept in really first class operating condition at all times.

The charges under group "F" are based on the investment involved in the production center, and are naturally higher for the steam hammer than for the board hammer. Under the subdivision (3) has been grouped all administrative, general office, sales and commercial expense. In certain plants where this runs high it is customary to add this as a fixed percentage on the total manufacturing cost. It is assumed, however, that this is the average jobbing forge shop, where these expenses do not run very high, as they might in the plant which carries a standard line of goods such as wrenches, pliers, and other hand tools.

#### Final Rate Per Hour, With and Without Dies

The final analysis indicates that the hourly rate for the steam hammer production center, without dies, is \$9 per hour against \$5.25 per hour for the corresponding board hammer.

For the steam hammer the die charge is \$3 per hour, against \$2 per hour for the board hammer, which charge includes the cost of die blocks, the labor required in their sinking and the proportionate die room overhead. In other words, it represents the cost of dies, should a forging company be obliged to purchase them from an outside concern. The cost per hour is 50 per cent greater in the case of the steam hammer than for the board hammer, due to the fact that a steam hammer is harder on dies than a board hammer. An investigation was made involving about twenty pieces which were run in both classes of equipment. Data collected from this experiment indicated that in general the life of a die was at least 50 per cent longer under the board hammer than under the steam hammer. Adding the die expense to the other expenses brings the final overhead rate to \$12 per hour in the case of the steam hammer, compared with \$7.25 in the case of the board hammer.

As we have developed both machine rates, it is possible for us to determine the cost of making a certain forging in either type of equipment. An example of such a cost per 100 forgings is given below:

	1500-Lb. Steam	1600-Lb. Board
Material, 205 lb. at 3½c.....	\$7.18	\$7.18
Direct labor .....	3.50	3.50
Overhead, 60 pieces per hr.....	15.00	8.75
Die charges .....	5.00	3.33
Total forging cost.....	\$30.68	\$22.76

It will be noted that the material and direct labor charges are considered the same in both instances, in accordance with the conclusion developed early in this paper. The difference in the cost is due entirely to the difference in the overhead cost of producing the forgings in the two different types of equipment.

#### Profit in One Case; Loss in the Other

It is apparent from the above example that, where as a manufacturer who was planning on forging this particular piece in a board hammer could satisfactorily sell it for 27c., the forge shop which attempted to make this piece in a steam hammer could certainly not sell it for this figure without suffering a severe loss.

Finally, the result of this investigation would indicate that in general it would not be desirable to install steam drop hammers smaller than 2500 lb. There are, of course, exceptions to this statement, but the exceptions are not so numerous as those unfamiliar with the excellent results obtainable on board hammers may think. Keep in mind the fact that the production obtained on board hammers, when they are installed in the same shop with a number of steam hammers, is never equal to the production which might be obtained on those hammers if they were installed in a separate shop removed from the vicinity of the steam hammers.

# The Possibilities of Fusion Welding\*

## Conditions for This Type of Weld —Control of Welders—Test of Welds—Success with Alloy Steels

— BY A. S. KINSEY —

**N**O modern mechanical process possesses more encouraging possibilities than the welding of metals by fusion. The welded joint is not of modern conception, and the forge weld undoubtedly dates back to the earliest working of metals. However, the other kinds of welds have been in use less than 20 years. All welding is done by either one of two principles, plasticity or fusion. The forge, the electric resistance and the thermit compression welds depend upon plasticity, while the electric arc, the thermit cast and the oxyacetylene welds employ the principle of fusion. The respective merits of these two methods of making welds are rapidly becoming well understood. Welding by plasticity has accomplished much. We have but to consider the manufacture of ordinary wrought iron and steel pipe to appreciate the value of the forge plastic weld. The speed and non-oxidizing features of the electric resistance weld also have proved to the greatest advantage, as in the making of steel chain for example.

But the plastic weld is limited in its application and is confined almost entirely to mild steel. The fusion weld however has a broader range of usefulness among the metals. Especially is this true of the oxyacetylene weld which is applicable to mild steel, tool steel, high speed steel, the new alloy steels, cast iron, wrought iron, aluminum, copper, brass, bronze, lead, tin, zinc, in fact all of the commercial metals may be welded by the oxyacetylene torch.

Now the possibilities of a good fusion weld depend on high tensile strength, ductility, density, control of the welders, and a proper method of testing welds.

### Tensile Strength

The tensile efficiency of a weld is based on its thickness being the same as that of the base metal. This efficiency is of first importance but it must not be obtained at the expense of ductility, that is the bending and stretching qualities of the metal. In the welding of steel, for example, the ductility is of much importance. Again to secure the proper tensile efficiency the welded metal must be thoroughly fused to the sides of the vee of the base metal. One of the best ways of securing a high tensile efficiency, say in mild steel, is to use a welding rod of nickel steel having a tensile strength nearly double that of the base metal. The result is likely to be a weld of higher tensile strength than its base metal. Of course the simple reinforcing of a weld is common practice.

### Ductility

The ductility of a fusion weld, particularly of steel, must be considered, although there now are some who would argue that a weld does not need to have bending qualities. One of the best illustrations of the value of ductility in a steel weld is to be found in the manufacture of welded steel tubing, which can be made cheaper than the seamless drawn tubing. In order to obtain small size tubing the practice is to weld the steel in diameters of from 1 to 2 in. and then cold draw these tubes to the smaller sizes desired, some of them being as low as 5/32 in. outside diameter with 1/12 in. hole. It is to be noted that this tubing has an oxyacetylene fusion weld along its full length of many feet, which must be capable of withstanding the strain of repeated cold drawing as the large tube is reduced to the smallest diameter. The weld not only withstands this treatment but also is found to be ductile enough successfully to

stand being flattened, crushed, knurled or bent. The welding of the larger size tube is done at the rate of from 3 to 5 ft. per minute with multiple tips in an automatic machine.

### Porosity

One trouble with welds has been the lack of homogeneity of the welded metal, and usually the trouble is due to oxides. This applies to all methods of welding but probably less trouble is experienced with the oxyacetylene weld. In most cases the weld must be absolutely nonporous and the density of its metal should be equal to that of the base metal. A fine illustration of what may be accomplished in this direction may be found in some recent designs of electric sterilizing transformers. In this type of transformer a high voltage terminal is filled with a combination of helium and nitrogen gases held at a constant pressure of about 150 lb. to serve as a gaseous dielectric. Of course it is necessary for the pressure of the gas to be maintained constant and therefore the welded joints of the transformers must not allow the gas to leak away. Many attempts were made to weld these transformers, but the welds proved to be so porous that the gas pressure could not be maintained until the oxyacetylene process was brought into use.

Oxyacetylene welding in this case has proved highly satisfactory and the elimination of oxides has been so complete that the weld is absolutely nonporous so far as the use of gas at high pressures is concerned. Other evidences of the nonporosity of the fusion weld may be found in its use in refrigerating systems where anhydrous ammonia plays an important part. In this case the weld must withstand high pungent gas pressures and be absolutely tight. The oxyacetylene weld has been very successful in this regard.

### Control of Welders

There must be a better control of welders. We must know more exactly what these men are doing in all of their work. Much attention is being given to this problem at the present time by the American Welding Society. One plan discussed is to require the shop foreman employing welders to have a thorough knowledge of the possibilities of the art so that he may be capable of inspecting the work of the welders from time to time just as he is familiar with and can pass on the work of other mechanics in his shop. The welders themselves should be trained thoroughly to understand the principles of their work by giving them say an evening course in the practical metallurgy of the subject. With these precautions, and assuming them to be of average intelligence and dependability, the danger of poor welds should be greatly diminished. Many oxyacetylene welding schools are springing up over the country and they will undoubtedly accomplish much good in this direction. There is another plan for controlling welders which is being considered carefully and undoubtedly will meet with much success. We speak of the testing of welds.

### Testing of Welds

A number of ideas have been suggested for the testing of welds. Some shops require their welders to make sample welds each month which are tested and the results posted on a blackboard for all the shop men to read. This has both its advantages and disadvantages. Another plan is to cut out a section of a weld, where it is practicable, and examine it for fusion and porosity. If the welder does not know just when his work is to be tested, he is likely to be forced to constant care. We know of some cases where

\*From an address delivered to the Cleveland Section of the American Welding Society May 6. The author is professor of shop practice at Stevens Institute of Technology, Hoboken, N. J.



welders are being required, after making a good sized weld, to stamp their initials and the date alongside of the job so that there can be no question as to responsibility of workmanship, if the weld fails. The testing of welds is of vital importance and it will be of interest to many to learn that a special committee of the American Welding Society is devoting considerable attention to the question at the present time.

The fusion weld made its debut in the repair shop. During the past 5 years however it has been gradually expanding to the manufacturing plant, where now it is of the greatest value. Its application to the automobile industry is well known. There was a time when nearly all steel tanks were riveted. Now there

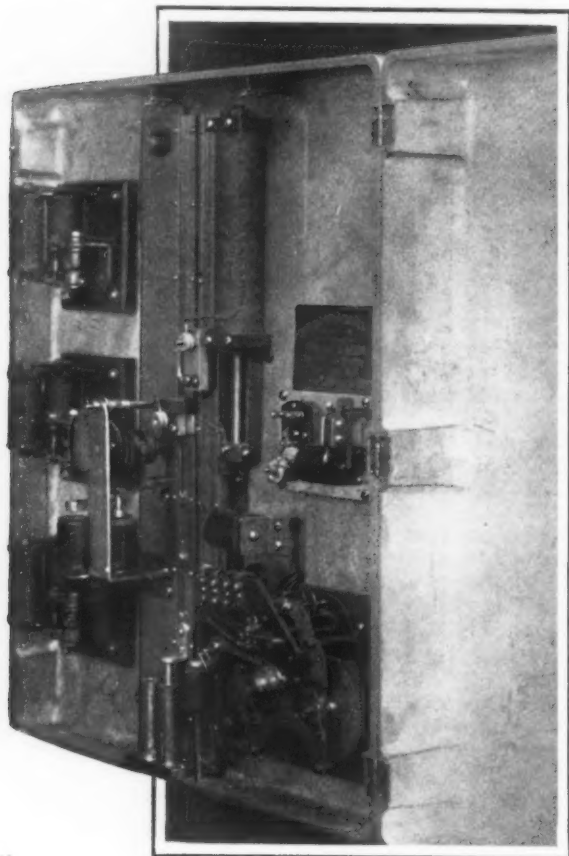
are millions of them being made each year with all welded joints. The all-riveted locomotive fire box is now being welded. Intricate castings which formerly it was impossible to make are now cast in parts and the parts welded together.

Fine success has been obtained in the experimental welding of steels such as nickel, chromium, tungsten, cobalt and vanadium. The depositing of alloyed steel on cheaper base metals where intense heat and wear are concerned has been successfully accomplished by the oxyacetylene torch. This is opening up a fine new field for fusion welding and making available certain applications of alloyed steels which were not practicable before.

## SAVING ELECTRIC CURRENT

### Automatic Device for Steel Furnaces for Which Large Economies Are Claimed

An automatic fuel saving device for electric furnaces has been invented and patent applied for by Edward T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y. The inventor states that the



The Moore Automatic Fuel-Saving Device for Electric Steel Furnaces

use of this device by his company, which produces electric steel on a large scale in several different types of furnaces, has saved about \$1,500 each month since they were installed or from October, 1919, to Jan. 1, 1921. A description of the apparatus furnished by the inventor follows:

The device is known as a maximum demand regulator, in connection with which is also a device known as a maximum demand meter. The regulator when properly connected in the main power circuit will be actuated according to the variations of power. The device has one element which rises at a rate depending upon the rate of consumption of energy, another element operating independent of the first element, but located so as to co-act with same under proper conditions, responding only to a time basis. In other

words, it is actuated by a contact closer which makes contact every 15 min. or half hour, depending upon the basis upon which the power is purchased.

Assuming, therefore, the contact to be in its normal position of the time element, with the contact of the energy element somewhat below it, it will be appreciated that as the contacting energy element rises, it will eventually come into contact with the time element, provided the rate of energy consumption is great enough to cause this action. When contact is made, relays interposed in the circuit are actuated, causing a definite fixed resistance to be inserted across one of the circuits of the furnace regulator panel located at the electric furnace. This amount of resistance which can be inserted automatically, can be so adjusted as to cause a load reduction on any one furnace or all furnaces in an installation, and causing a load reduction on each furnace of a predetermined amount. Therefore, when a maximum demand occurs for which the regulator is set, the load is automatically cut on the furnaces at a predetermined amount, said amount being adjusted to a value which will not slow down production or increase the length of the heat being made in the furnace.

Operating coincidentally with the energy element is a pen device which will trace upon a chart driven by a suitable clock, the progress of rise of the energy element during the demand period, about 15 min. At the end of the 15-min. period, suitable contact is made by a clock restoring both the energy element and the time element to their normal position ready to begin another operation. It will thus be seen that the pen will trace upon the chart the maximum demand during any demand period, which can be read off directly in kilowatts if desired, thus eliminating some of the objections of some of the present demand meters.

At the works of our company we have had one of these regulators installed since Oct. 1, 1919, and up to Jan. 1, 1921, we have saved conservatively \$1,500 per month. There have been months when we have saved over \$2,000 by the use of this device, simply because the demand had been kept down some months over 2000 kw., and, as we pay a demand charge of \$1 per kw., the apparent savings will result. Since Jan. 1, 1921, we have been operating only one furnace part of the time, so, naturally the savings can only be in proportion. The power bills during normal production run as high as \$25,000 per month, and even greater savings than those indicated might be effected, it being possible to cut the load on the furnace a greater amount than we are doing at present.

On a 6-ton Heroult furnace drawing a normal load of 150 kw., the amount of cutting at the time of peak load can be conservatively fixed at about 400 kw., but during refining, when the normal load is only about 400 to 500 kw., the amount of cutting can not be much greater than 75 to 100 kw. Otherwise, the input into the furnace would be so reduced during the cutting period as to seriously affect the temperature within the furnace, having a deleterious effect upon the steel. The device inherently takes care of this load variation, that is, cutting a relatively large amount when large consumption obtains during melting, but cutting only a small amount relatively when a small load is being taken during refining.

# Electrical Cleaning of Blast Furnace Gases\*

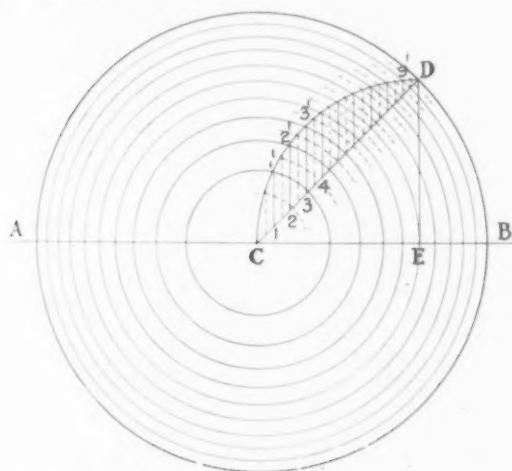
## What the Problem Is — Why Present Methods Fall Short of Desired Results— How the Electrical Screen Does Its Duty

BY N. H. GELLERT†

IN November, 1919, a paper was read by the writer at the meeting of the Philadelphia section of the Association of Iron and Steel Electrical Engineers on the general subject of "Electrical Cleaning of Gases as Applied to Blast Furnaces." Since that paper was read there have been several changes in the electrical cleaners at the two plants where they have been installed, at Dunbar, Pa., and at Sheridan, causing a decided improvement in the operation of both plants. As a matter of fact, Sheridan has been put into operation since the last paper was read. Naturally, as time goes on, a great deal is learned that is new. Methods and apparatus are therefore developed to further the art of electrical precipitation. It is with this in view that the writer will endeavor to discuss, not so much the actual physical plants now operating at blast furnaces with electrical cleaning apparatus, but methods and features which enter into the general problem of investigation and adaptation of electrical cleaning to blast furnace gases.

### General Gas Cleaning Problem

In general the problem, including that of other gases besides those that issue from a blast furnace, may be split into two parts:



To Lay Out Concentric Rings of Equal Area Within a Pipe: On horizontal line AB lay off the diameter of pipe to scale. Draw the circle corresponding to the pipe and through the center C erect 45 deg. radius CD. At intersection D drop line DE perpendicular to line AB. With intersection E as center draw arc of circle CD. Divide radius CD of large circle into desired number of equal parts. Project these points to the arc CD and parallel to DE, intersecting at 1', 2', 3', ... 9. With C as center draw circles of radii, C1', C2', C3', etc. The annular rings between these circles will be of equal areas. For velocity measurements the Pitot tube should be located at the mean velocity points of each ring. These radii are determined by laying off on radius CD the points midway between 1 and 2, 2 and 3, 3 and 4, etc. These are projected, parallel to DE on the arc CD. This point of intersection, with C as center, fixes the radius.

1. The cleaning of non-combustible gases,
2. The cleaning of combustible gases.

Non-combustible gases usually issue from furnaces or stacks in which gas either has been utilized for combustion purposes or the non-combustible gases are driven off by heat primarily as inert gases.

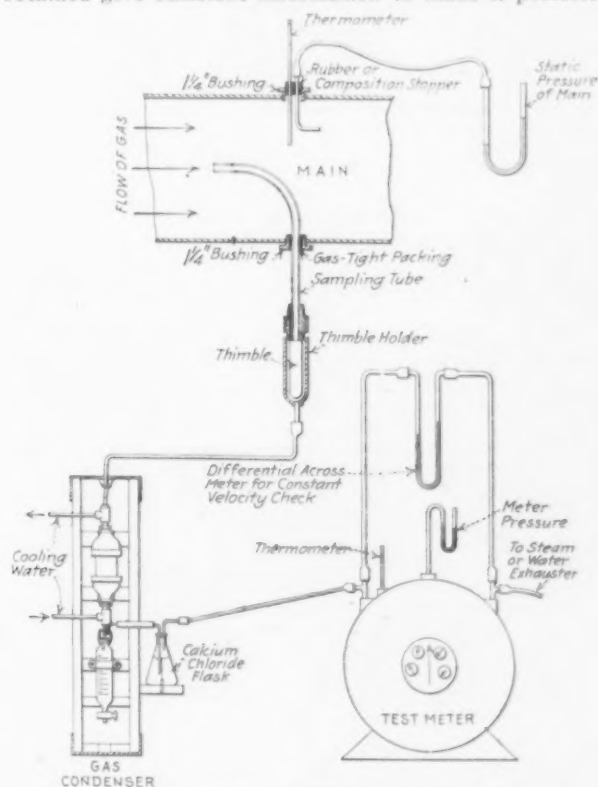
Combustible gases, in the second part of the general problem, include gases used for industrial purposes, manufactured in producers, in coal gas and water gas plants and also gases issuing from the blast furnace.

In general, blast furnace gases contain 2 to 10 grains of dust per cu. ft. of gas at standard condi-

tions of temperature and pressure, namely at 62 deg. Fahr. and 29.92 in. of mercury, which is atmospheric pressure. This dust exists in the form of both dust and fume. The fume is so finely subdivided, however, that in a great many respects it acts as a perfect gas. To determine how to apply a cleaner to the blast furnace gas, there are at least four things which must be investigated:

1. Temperature,
2. Velocity and volume,
3. Dust content,
4. Moisture content.

It is evident that, since the measurements are made under the most difficult conditions, usually out in the open air and under a varying condition of load with variations in temperature, velocities, dust content and moisture content, the data must be taken over a long period of time if they are to be of any real value. In addition, inaccuracies will be encountered in the actual measurements, due to the fact that it is not as a rule possible to take them under the conditions necessary for extreme accuracy. Nevertheless, the measurements obtained give sufficient information to make it possible



Typical Gas Sampling and Measuring Setup of Instruments

for a blast furnace operator to get a fairly good indication of what he is doing, and how to correct any conditions that need correction.

### Determining Velocity and Volume of Gas

To make a volume determination a Pitot tube of a standard type, a manometer tube, rubber tubing, some boards and nails, measuring rule and a few tools are necessary. A gas measuring station location should be selected in the gas main where the most uniform gas flow conditions are approximated. The conditions are always adversely affected by bends, connections, offtakes, explosion doors, manholes, etc. It is seldom that a station can be selected in blast furnace gas main systems which will give the ideal flow conditions

\*Abstract of paper read before Cleveland section of Association of Iron and Steel Electrical Engineers, Cleveland, April 11.

†President Gellert Engineering Co., Philadelphia.

assumed in theoretical discussions. If a straight portion of main can be found, four to ten times the diameter in length and without valves, offtakes or some other interfering object, the conditions may be assumed to be good for gas measurements.

After this station has been located, it is necessary to determine the inside dimensions of the main in which the flow of gas is to be measured. If the main is horizontal, care should be used in sounding the inside bottom of the main for any deposits of flue dust which may reduce the total cross-sectional area. The area of the circular main should then be calculated.

Velocity of gas flowing through the main is greater at the center than near the walls. Therefore, to get the average gas velocity, it is necessary to take a large number of velocity readings across one or (preferably) two diameters of the main. By dividing the main into equal areas it is possible to get the average main velocity in the simplest way, and with the least expenditure of time. The average velocity of the total gas flow will be the average of the velocities obtained at the mean velocity points of the equal area zones.

If the main is very large and great accuracy is required in the measurements, twenty equal area zones should be used instead of ten. If less accuracy is

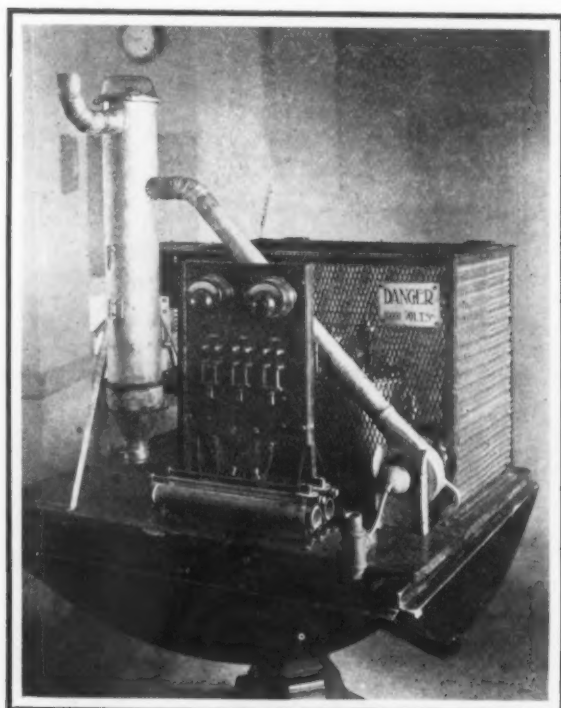
Table 1—Ten Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

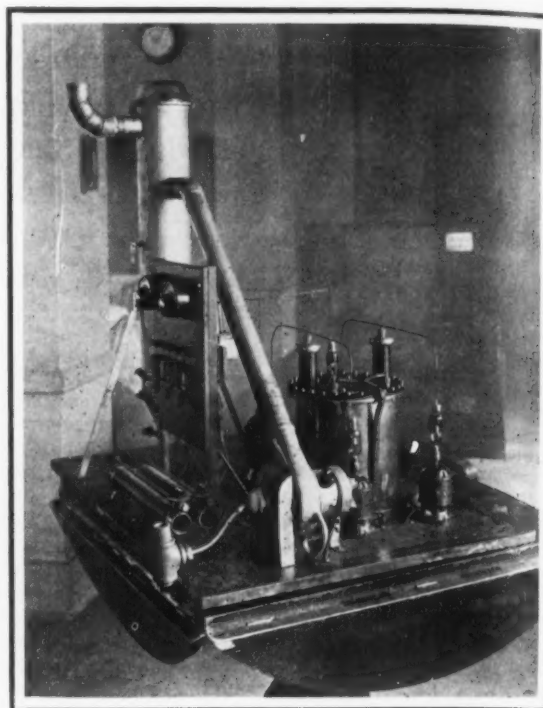
Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point	
			Percentage of Pipe Diameter Radii	Distance from Side
1	31.6	15.8	11.2	38.8 and 61.2
2	44.7	22.4	19.4	30.6 and 69.4
3	54.7	27.4	25.0	25.0 and 75.0
4	63.2	31.6	29.6	20.4 and 79.6
5	70.7	35.4	33.5	16.5 and 83.5
6	77.5	38.7	37.1	12.9 and 87.1
7	83.7	41.8	40.3	9.7 and 90.3
8	89.4	44.7	43.3	6.7 and 93.3
9	94.9	47.4	46.1	3.9 and 96.1
10	100.0	50.0	48.7	1.3 and 98.7

permissible, and for ordinary sized mains up to 3 or 4 ft. diameter, only five equal areas need be used. A graphical method of laying out any number of equal concentric areas in a section of a circular main is shown. The directions for doing this are given in the caption.

Tables 1 and 2 give the data for laying off a circular main into ten equal areas, and also into five equal areas, and also show the distance of the mean velocity point for each concentric area from a given



Experimental Apparatus Set Up for Demonstration Purposes



Side View of Experimental Apparatus, with Screen Removed Which Normally Guards the High-Tension Connections

point inside of the main. In all this discussion, this point inside of the main, when used in making measurements, is the inner edge of the lining at the point where the Pitot tube is introduced into the main.

The central area of the main will have the cross section of a circle, while all the other areas will be annular cross sections of varying widths. The outermost ring, closest to the pipe, has the smallest width, while the innermost ring, closest to the center, has the greatest width. This, of course, results from the requirement of having equal areas. When accurate measurements are required and nearby bends or connections cause swirls and eddies in the main, two traverses should be made in the main at right angles to each other, one vertical and one horizontal. For this purpose two holes are made in the main on diameters at right angles to one another. The Pitot tube is inserted first through one of the holes and then through the other.

Under normal conditions of blast furnace operation, the following simple formula, which has been used with sufficient accuracy for air measurements, will be found to apply without appreciable error to blast furnace gases.

$$V = 2.9 \sqrt{TH}$$

$V$  = the gas velocity in ft. per sec.

$T$  = absolute temperature in deg. Fahr. ( $t + 460$ )  
(more closely 459.6)

$H$  = velocity head in inches of water.

This holds true because the density of blast furnace gases is almost identical with that of air. Ordinary

Table 2—Five Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point	
			Percentage of Pipe Diameter Radii	Distance from Side
1	44.7	22.4	15.8	34.2 and 65.8
2	63.2	31.6	27.4	22.3 and 77.4
3	77.5	38.7	35.4	14.7 and 85.3
4	89.4	44.7	41.8	8.2 and 91.8
5	100.0	50.0	47.4	2.6 and 97.4

air at 32 deg. Fahr. and 29.9 in. mercury weighs 0.0807 lb. per cu. ft., and blast furnace gas under the same conditions will weigh between 0.0794 and 0.0819 lb., depending upon the kind of ore used and the furnace practice. Furthermore, the pressures found in blast furnace mains beyond the first dust catcher seldom



exceed 6 in. of water above atmosphere, which corresponds to only 0.22 lb. per sq. in. added to the normal atmospheric pressure of 14.7 lb. per sq. in.

After a series of Pitot tube readings are made in each one of the ten equal areas, the same kind of measurement is made at right angles to the original measurements. This enables the investigator to get the average velocity of each area. By averaging the velocities of the equal area zones, he can get the closest approximation to the main velocity, and consequently the volume of the gases passing through the main. The formula for the volume is

$$Q = 60 AV$$

Where  $Q$  = the volume in cu. ft. of gas flowing per minute

$V$  = the velocity in ft. per sec.

$A$  = the inside cross section of the main in sq. ft.

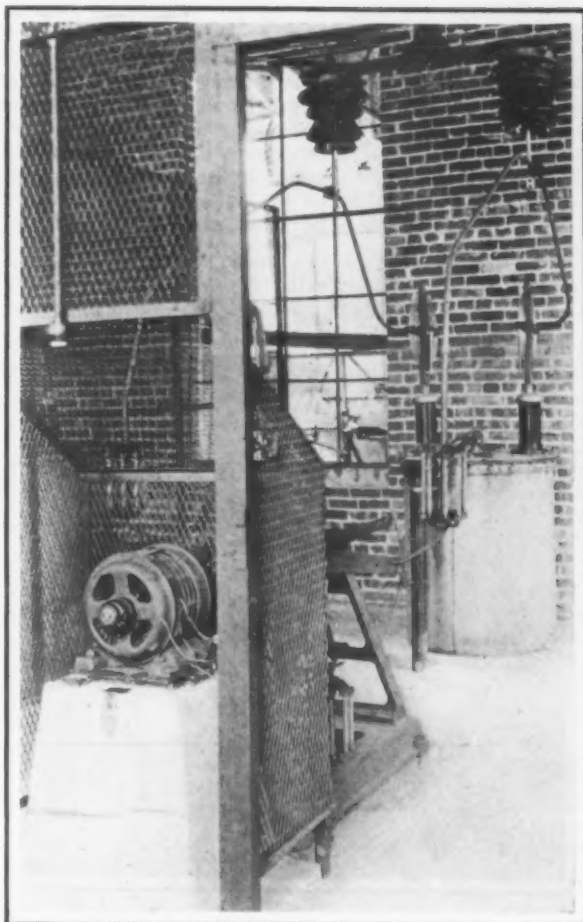
#### Methods of Cleaning Blast Furnace Gases

Two general methods of cleaning blast furnace gases are in use:

- 1—Wet cleaning,
- 2—Dry cleaning.

A great deal of money has been spent in developing wet cleaning methods, and a great many wet cleaners are now installed on blast furnace plants throughout the country. Nevertheless, because of certain fundamental undesirable factors, there has been a tendency on the part of operators to get away from wet cleaning and to go to dry cleaning. The main objections to a wet cleaning process are:

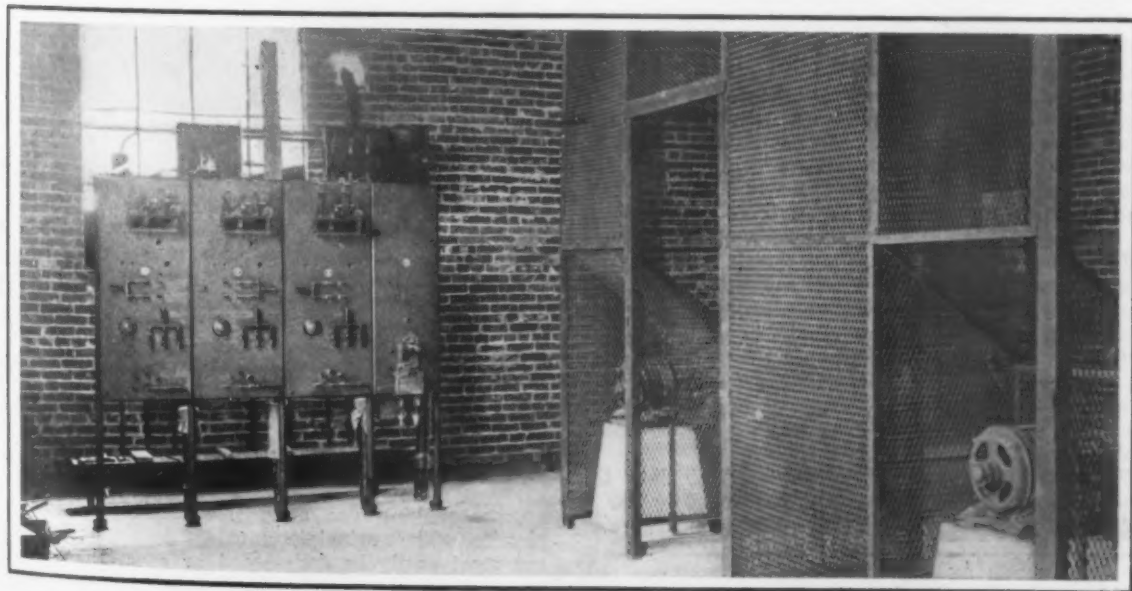
1. Loss in sensible heat, due to the reduction of temperature of the gas when using large quantities of water, which are necessary in order to get the best results from this method. A table taken from Mr. Diehl's paper, before the American Institute of Mining Engineers in 1914, shows that nearly 8 per cent greater B.t.u. exist because of the sensible heat in unwashed blast furnace gas at 400 deg. Fahr. and with 35 grains of moisture per cu. ft., as compared with washed gas at 70 deg. Fahr. and with moisture saturation at 70 deg. When using 625 tons of coke per day, at a 500-ton blast furnace, about 50 tons of coke might have been saved per day. At \$6 per ton, a saving of \$300 per day for 300 days amounts to \$90,000.
2. The second objection is the pollution of streams. It has been found that, at several blast furnace plants, fish life and bacteria are eventually destroyed in those streams where the effluent of the washer is discharged. This has resulted in some places in enjoining furnaces from discharging the effluent into the streams. In other places, it has resulted in controversy. The trend of municipal and state authority is toward the prohibition of discharges dangerous to fish life. The elimination of this possible contention is advisable.
3. Wet washers often are not very efficient. The



Each Motor Is in a Cage Where It Can Be Reached, the High-Tension and Transformer Connections Being Behind the Screen

result is, especially where there is much fume in the gas, that the washer does not remove the fume and dust to a sufficiently great degree. The dampened particles of fume and dust deposit in the stove burners and in the boiler burners and, because of their hydraulic qualities, stay in the burners until they become a hard mass, which eventually has to be dug out with chisel and hammer. At some plants, this is a real nuisance and causes money losses due to the necessity of shutting down the stoves and boilers and cleaning them.

4. Another objection is the necessity for large quantities of water. This means a large pumping plant, maintenance and repairs of pumps, a great deal of moving machinery and a large source of supply of water. This is not always available, and more than



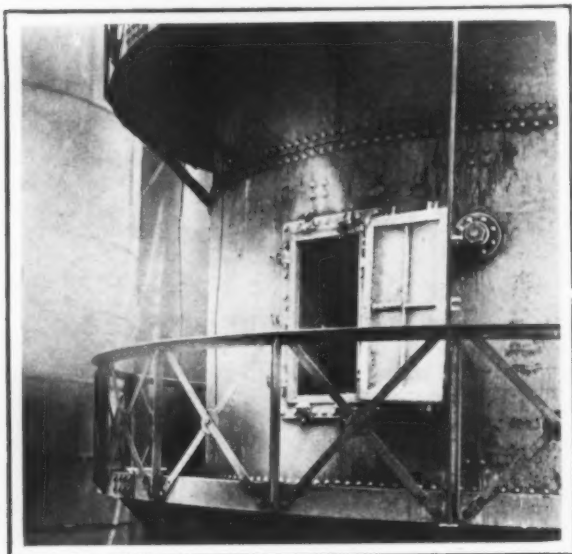
One Unit of Apparatus Includes Switchboard, Transformer, Rectifier and Motor

one plant has not gone to cleaning its gases, because of its inability to get water.

Throughout this paper, it must be understood that the cleaners discussed are not secondary cleaners or intensive scrubbers, but are primary cleaners, used to remove dust from the gases to such a degree that the gas may be burned effectively in the stoves and boilers, and not at all intended for the cleaning of gases for gas engine purposes.

#### Dry Cleaners Used Abroad

Practice in Europe has been somewhat different, as there were early efforts to develop dry cleaners. As a matter of fact, dry cleaners have been operating



Dust and Fume Coming Out with the Current On

in Europe for some time, and have been mainly objectionable from two standpoints:

1. Their high cost,
2. Possible damage to the cleaner.

While the cleaners built in Europe (of the bag type) cleaned the gas more effectively than any primary cleaner could, and even went so far as to prepare the gases for gas engine purposes, the bags, being inflammable, necessarily were subject to destruction whenever the heat put through the cleaners exceeded the safe limits of their material. The high cost of installation of this type of cleaner also militated greatly against their adoption, and perhaps was the chief reason why such dry cleaners were not installed in this country. And the sensible heat lost in cooling the gas robbed it of a great deal of the economies which might be obtained were the sensible heat retained.

With dry cleaners able to pass the gas without any considerable reduction in temperature, there is to be added to the efficiency caused by the cleaning of the gas, the efficiencies effected by the use of the sensible heat. Certain difficulties, however, in the cleaning of gases by the dry process must be taken care of.

Any screen type of cleaner which attempts to filter out particles of dust and fume, even when the filtering medium is not destroyed by the normal heat of the blast furnace gas, must be sufficiently fine in nature to present a hole smaller than the finest particle of dust and fume going through, in order to remove successfully the objectionable solid material in the gas. If the screen is so fine that it will remove the particles of fume, the back pressure will be high and the screen will clog up quickly. If the screen is designed with apertures large enough to prevent any considerable back pressure, the fine particles of fume and dust will go through. The problem, therefore, of screening the fume and dust out of the blast furnace gas is not a simple one.

This same difficulty was encountered during the war in the elimination of mustard gas, existing not in the form of gas, but in the form of dust and fume of a very fine nature. When the mask was made with a filter fine enough to keep all of the mustard gas out, breathing was exceedingly difficult. When the mask

permitted easy breathing, mustard gas fume at times penetrated it. The American Chemical Warfare Service, at the time of the armistice, had developed an apparatus for removing the danger due to the inbreathing of mustard gas, and the difficulty of breathing through a very closely packed filter. The apparatus which the Service decided to try out was exactly, in principle, the one kind of apparatus now being applied to dust and fume collection from blast furnace gas.

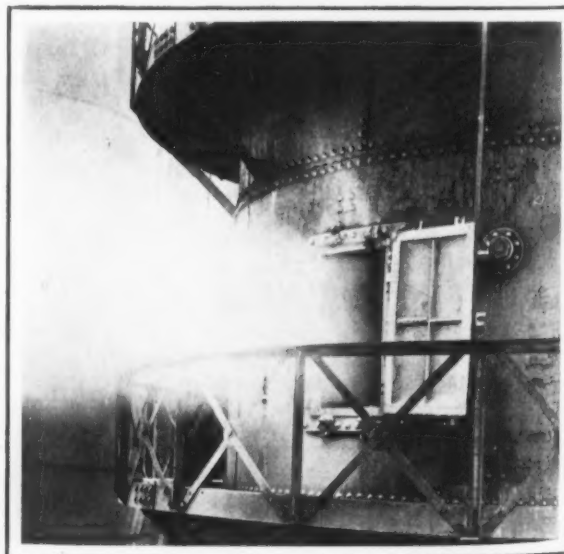
#### Handling of Hot Gases

It is evident that conditions arise when the gas discharging from the furnace top is very hot, and it is impossible to utilize any system of dry cleaning without destroying the cleaning medium; for instance, in the manufacture of ferromanganese, the gases discharging from the furnaces have temperatures running as high as 1500 deg. Fahr. As steel glows red hot at temperatures of this kind, some necessity arises for cooling the gas to such a point that destruction of the steel does not take place.

As a matter of fact, both at Dunbar,\* and Sheridan,† where ferromanganese is made, the problem has been a very serious one. It has not been a question of whether the cleaner could operate or not at such temperatures, but simply of whether steel could maintain its strength or not under such conditions of stress. As all steel men well know, the strength of steel drops very rapidly with the increase of temperature, until at about 1500 deg. the strength is less than one-quarter of the original strength.

Some means must be devised to cool the gases to such a point that they may be safely passed through the cleaner. This problem is not at all present in furnaces manufacturing pig iron, as the temperatures rarely run over 400 to 500 deg., though in exceptional cases they may reach 700 to 900 deg. Steel can be made to stand this strain.

With the hotter gases, however, it is necessary to design coolers that will function without the addition



Dust and Fume Coming Out with the Current Turned Off

of moisture to the gases. If it is desirable to cool the gas from 1300 deg. to 400 or 500 deg., so as not to lose the sensible heat in the gas at this lower temperature, care must be taken not to add water for cooling purposes, as the amount of water present when the gas is saturated at 400 deg. is so great that it would seriously handicap combustion in the stoves and boilers. A cooler, therefore, must be of such type that the heat is transferred from the gas into the water through tubes and not by direct contact.

#### Electrical Gas Cleaning

Electrical cleaning of gases, as developed several years ago by Dr. F. G. Cottrell, is a very simple process making use of a few fundamental facts in physics. The principle involved is not difficult, and can most easily be understood by conceiving of a gas

\*American Manganese Mfg. Co. †Lavino Furnace Co.



passing through an invisible electrical screen so fine that the finest particle of fume cannot pass through, yet occupying no space, having no material body and consequently presenting no source for back pressure. It is by means of this electrical screen interposed between the outlet of the furnace and the inlet to the hot stoves and boilers that blast furnace gas may be cleaned of its dust and fume content to a degree finer than any mechanical screen can clean it without considerable loss in back pressure.

The reason for this is that the electrical screen is woven, not of wires, but of lines of electrical force. The threads of force constituting the screen are so closely knit together that a substance must drop below its molecular form to get through, when conditions are correct for the screen to operate. Yet these lines of force, having no material body, do not interrupt the flow of gas, on which they have no effect whatever. In a simple manner, the action of an electrical cleaner may be described as follows:

The gas is conducted upward through a vertical pipe. An electrode chain or wire, suspended vertically in the exact center of the pipe, is held taut by a weight at the bottom. This electrode is charged with high tension unidirectional current. It therefore must be suspended on the proper insulators, which are capable of withstanding the potential under which they are impressed. The pipe itself is grounded.

Dirty gas, passing through the pipe and coming into contact with the charged electrode, becomes ionized. As the electrode is negatively charged, and has a corona discharge due to the high potential impressed upon it, the ionization of the gas is rapid and thorough. The gas molecules carry the charge to the dust particles, which for the most part are negatively electrified, since the electrons prevail in the gas. Immediately upon being charged, the dust and fume particles are repelled by the electrode and are deposited on the sides of the pipe, which interrupt their flight from the chain.

Within the pipe, therefore, there are three forces in action. There is a vertical force due to the velocity of the gas, which is carrying the dust and fume particles upward. There is the force of gravity, which tends to carry the dust particles downward. Since the force due to the upward velocity of the gas is much greater than that due to the action of gravity, the resultant of these two is a vertical force upward. The third force is that caused by the charging of the dust particles through the ionization of the gas. This is a horizontal force, as the action of repelling the particles from the chain is at right angles to the chain.

The resultant of these two final forces is the diagonal of a parallelogram, having both these forces as sides. If the vertical force is very great, too great for the particular pipe described, the horizontal force may not be sufficient to cause a resultant that would precipitate the particles of dust to the sides of the pipe. While the particle of dust would be acted upon by the horizontal force, the resultant might be such that the particle would not travel to the side of the pipe within its length.

#### Application of Theory to Practical Conditions

The problem, therefore, in electrical precipitation is to regulate the vertical force so that it is not too great, and to make the horizontal force sufficiently great to form a resultant which will precipitate the particle of dust to the side of the pipe. The principle is not simply one of ionization and is not one of magnetism. The particle of dust does not stick to the side of the pipe because of the magnetism caused by the corona discharge and gas flow, but because it is held there fast by the resultant electrostatic force acting upon it throughout the entire period of operation. It is as though an arm had extended diagonally from a point on the electrode and pinned the particle of dust to the side of the pipe with a finger, and were holding it there without letting go.

Control of the vertical force is, of course, made in the design of sufficient cross sectional area in a precipitator to give what has been found to be the best velocity of the gas for precipitation purposes. To get

the horizontal force necessary for precipitation is a question of design of electrical equipment. The voltage that can be impressed on the electrode is limited by the gap between the side of the pipe and the electrode. This has erroneously led to the assumption that the bigger the pipe, and the greater the voltage that may be impressed, the stronger the force that may be secured to act horizontally. This is not true, as the force varies inversely as the square of the distance between the object to be precipitated and the electrode, so that even with higher voltage, the impressed force on the particles may be less than with lower voltage.

To develop the current which will do the work necessary in an electrical cleaner, certain electrical apparatus has been specially developed. The larger electric companies have spent a great deal of money in the research work necessary to develop apparatus wholly dependable under the severe conditions of usage in this work. The pieces of electrical equipment, however, are few in number, and are divided into units.

One unit consists of a switchboard, transformer, rectifier and motor, and the necessary insulators and conductors for getting current into the precipitator. The switchboard is a special panel having on it a circuit breaker, ammeter, voltmeter, double-throw, double-pole switch, set of sockets for voltmeter blocks, three-pole starting switch, and a five-point transformer switch. Back of the panel are the starting rheostats for the synchronous motor, and below are the resistances in series with the transformer. All connections on the panel are of low tension.

All the high tension connections are inside steel guard work, to prevent the operator from coming in contact with the high tension equipment. The circuit breaker is used to break the transformer primary circuit when the voltage exceeds a safe limit for the transformer, while the double-throw switch underneath the instruments is used to cut in the line on the right polarity. The five-point switch is used to obtain a different transformer ratio without leaving the operating position at the switchboard, and without the necessity of going into the high-tension room to make any change in ratio.

The rectifier consists of a rotor and a stator, the former revolving in direct unison with the synchronous motor, as the motor is directly connected with it by a coupling. Since the four-pole synchronous motor, running on 60 cycles, revolves at 1800 r.p.m., and since there are 3600 cycles in each minute, there are two cycles of alternating current to every revolution of the motor, and consequently of the rectifier. The latter acts much the same as an armature on a direct current generator, since it is acting in synchronism with the revolutions of the motor, and consequently with the alternating current.

It is always desirable to apply negative current to the precipitator, and consequently to the transformer and rectifier, if the polarity is right, as may be determined by the method to be described later.

Of special interest is the transformer built for precipitation purposes—very compact, although considerably larger for the same power output than are transformers used on lower voltages. Great care is used in the selection of the silicon sheet steel, cut into strips for the transformer coil laminations, and annealed and treated so that they may be successfully used in the high tension transformer. The low tension coils are wound of copper wire, usually of rectangular cross section covered with a double layer of cotton. If these coils are wound for several voltages, as they are for precipitation transformers, two layers of windings are made with the taps distributed along the middle length of the outer layer. In transformers in use for blast furnace precipitation there are five taps.

Insulation between the high tension and low tension circuits consists of a black varnished material similar to cambric, and is usually wrapped to a thickness of nearly  $\frac{1}{4}$  in. The high tension coils are then assembled in specified order, with the proper insulation over the low tension coils or, in some designs, beside them, after they have been independently wound and insulated.

This portion of the transformer has engaged pos-



sibly the most serious and careful attention of the designer. The service represented by the Cottrell precipitator with a mechanical rectifier in circuit is the most severe which can be imposed upon a transformer. There are about eighteen separate coils in the high tension winding of the usual sized transformers used in precipitation work. These may be divided into the following groups:

1. The buffer or end coils.
2. The intermediate group.
3. The main winding proper.

The buffer or end coils are supposed to receive the most severe electrical strains. Undoubtedly, they do receive the extreme effects due to a very steep electrical wave front impinging on the transformer windings, and accordingly they are provided with extremely heavy insulation between turns.

Some special features in connection with the development of the equipment for precipitation are present in the installation erected at Sheridan. The electrical house, as originally built there, was of brick, 22½ ft. square. It was built independently of any other building but, after it had been erected, one end wall was torn down and the house in which the generator sets were placed was built on to it, so that the whole electrical equipment would be together. These generators were used not only for furnishing power to the precipitator sets, but also for furnishing power to the cars at the bins, supplying the skip hoist. The house was built on an embankment which brought it on the level with the operating platform of the precipitator. There is sufficient room inside of the house for a duplicate set of equipment should that later be desirable.

The three major insulators placed in the high ten-

sion compartment, which are the only insulators exposed to the gas, are of the floor bushing type. It is necessary to clean these about once a month. To make it possible to get at these without shutting off the gas from the precipitator, the compartments are equipped with small valves which can be quickly closed, and small doors which can be readily opened. The operator, standing in the open air and extending his hand into the compartment, can readily clean the insulator in a short time. The adoption of this type of insulation has made it possible to operate much more continuously than before, when there were thirteen insulators on the inside of the precipitator, and when cleaning these insulators necessitated the complete shutting down of the plant and the cooling of the precipitator.

Results obtained both at Sheridan and at Dunbar have been satisfactory; at Sheridan, particularly. The precipitator there has been operating continuously and collecting approximately 5000 lb. of dust per day from approximately one-half of the gas output of a 250-ton furnace.

This dust is extremely fine in nature and ignites on exposure to air. It has consequently been impossible to determine the fineness of the dust, as it sinters as soon as it is dumped, and screen tests taken after the dust has cooled off do not indicate the condition of the dust when collected.

When tests were made on the Dunbar plant, running on pig iron, before it was turned on ferromanganese, the indications were that the precipitator could clean ordinary gases from a pig iron blast furnace to less than 0.1 grain. The two plants now running have clearly indicated that electrical precipitation is on the right road as an effective method of cleaning gases from blast furnaces.

## Embrittling Effect of Pickling Upon Carbon Steel

Study of Grain Sizes Shows That Pickling Increases Width of Junction Lines Between Grains

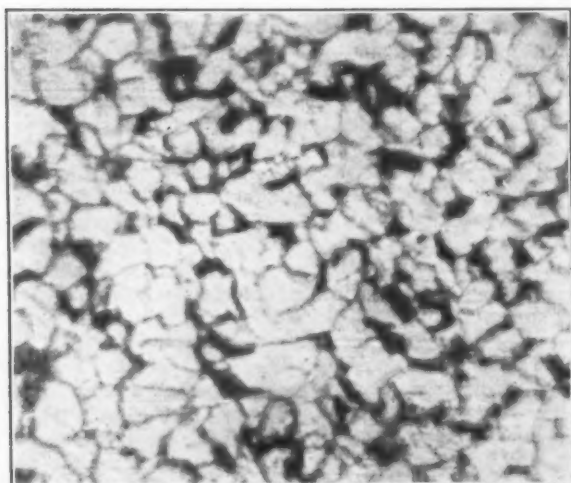
—BY C. J. MORRISON\*

THE fact has been known for many years that steel after being subjected to pickling processes showed a tendency to brittleness. This embrittling effect is particularly noticeable in wire, small rods and thin sheets

maintained for the microscope to show exactly what takes place in the metal.

An ordinary black sheet 30 x 32 x 0.058 in. was pickled by the sulphuric acid process and then baked for 15 min. at a temperature of 300 deg. Fahr. Samples for the microscope were taken from the sheet as received, after pickling, and after baking, and photographs, here reproduced, were made to show the structure.

The changes that have taken place are clearly shown and the fact that No. 1 and No. 3 are almost identical shows that the metal has been restored to its

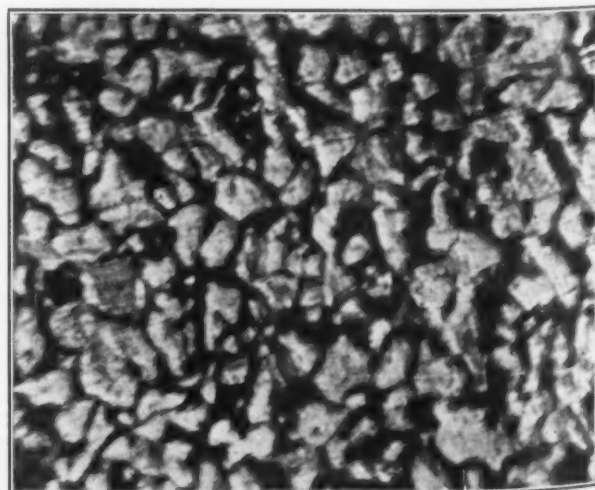


Photograph No. 1 Shows the Sheet as Received

and sometimes renders the metal unfit for use in certain products.

Experiments showed that the steel would apparently return to its original condition if raised to a temperature of about 300 deg. Fahr. and held at that temperature for a few minutes. Many theories have been advanced to explain the phenomenon, but it re-

\*1156 Carlyon Road, Cleveland.



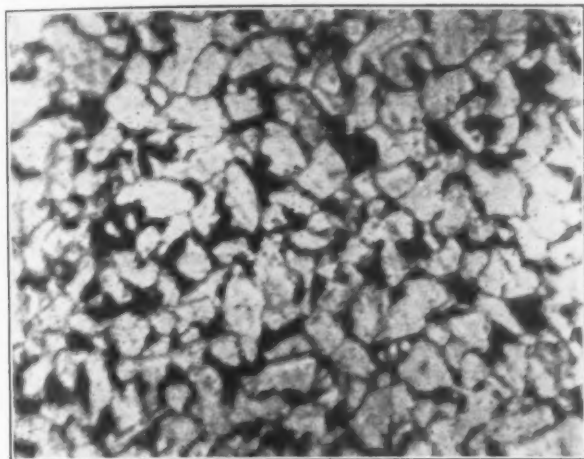
Photograph No. 2 Was Taken After Pickling But Before Baking

original condition. An analysis of the micrographs shows what has taken place.

In No. 1 the grain size is 0.0007019 in. and the width of the junction line is 0.0000274 in. The scleroscope shows 31 to 32 H.

In No. 2 the grain size is reduced to 0.0006805 in. while the width of the junction line has increased to 0.0000640 in. This increase in the width of the junction line should be particularly noted. The scleroscope shows no change but gives 31 to 32 H.

No. 3 is practically the same as No. 1 and shows a grain size of 0.0007141 in. and the width of the junction



Photograph No. 3 Shows the Condition After Baking for 15 Min. at 300 Deg. Fahr.

tion line is 0.0000274 in. Again the scleroscope shows practically no change but gives 29 to 31 H.

This analysis shows conclusively that the brittleness is due to the increase in the width of the junction line and also that the baking restores the metal to its original condition.

The micrographs were prepared and the analysis made by C. G. Zanzinger, metallurgist, Atlas Tack Corporation, and to him should be given the credit for solving the perplexing problem of brittleness.

### Coal Handling Plant for Melbourne Proposed

WASHINGTON, Aug. 9.—The railroad commissioners of the State of Victoria, Australia, have strongly advocated the erection of a thoroughly modern coal-handling plant at Melbourne, reports Trade Commissioner A. W. Ferrin. It is understood that a site will be selected near the Victoria dock. The estimate of the cost is £150,000 and the provisions for this expenditure will be made in the railroad loan application bill, to be introduced in the State parliament early in the session.

Technologic Paper No. 191, of the Bureau of Standards, entitled, "Some Factors Affecting the Life of Machine Gun Barrels," gives star gage measurements on six machine gun barrels at various stages of firing which indicate that, when the life limit is reached, exhaustion is due to a combination of the abrasive action of the bullet and the abrasion of gases. Amorphous martensite on the surface of the bore has been reproduced by the high temperature from an electric arc, its formation being due to the extremely rapid cooling caused by the large mass of cold metal near the highly heated surface. Cracking of the bore is due to dimensional changes of the hardened brittle surface of the steel resulting from the variations in temperature between separate shots. The cracks originate at irregularities of the surface of the bore.

Scrap metal and iron and steel will be sold through sealed proposals by the salvage division of the arsenal at Rock Island, Ill., bids to be received not later than 2 p. m., Aug. 15. Over 500 tons will be disposed of.

## MORE STEEL UNEMPLOYMENT

### Falling Off in Business Reflected in Men Out of Work

WASHINGTON, Aug. 9.—Decrease of 24,816 employees in the iron and steel industry in July represented a decline of 7.6 per cent when compared with June, according to figures of the United States Employment Service. Those engaged in this industry constituted 21 per cent of the total employed in 14 groups. In metals and metal products, other than iron and steel, the decline was 1300 workers, or 1.8 per cent. The survey, covering 1428 firms in 65 large industrial centers, each firm normally employing 501 or more, the total being 1,600,000, shows a net decrease of 16,914, or 1.1 per cent on the payroll at the end of July. The net decrease in these same establishments since Jan. 31 has been 117,924, or 7.3 per cent.

Industrial classifications showing increase in employment are vehicles for land transportation; railroad repair shops; leather and its finished products; textiles and their products; lumber and its manufactures; tobacco manufactures and paper and printing. All other classifications show a decrease, the largest decline in unemployment having been in a prominent iron and steel center, Youngstown, Ohio. Amounting to 4,927 workers or 22.8 per cent, this reflects the inactivity of the chief industry in that city.

Iron and steel and metal lines stand out, throughout the report as the darker side of the industrial situation. From mining to manufacturing, the entire industry in all its ramifications has felt the full force of the existing industrial depression. As a result, serious unemployment continues in a great number of inter-related industries and in widely separated sections of the country. The outstanding causes are held to be a falling off in the foreign demand and continued listlessness of the domestic market, creating an almost unprecedented lack of orders.

Analysis of the returns seems to indicate that in the majority of instances where there has been improvement in the employment situation, it is primarily traceable, directly or indirectly, to the harvest and other seasonal agricultural activities. Secondly, and to some extent as a natural corollary, there have been material gains in railroad occupations, principally in those which have to do with repairs to rolling stocks and roadbeds. Despite an obscured outlook there is manifest a general optimism, which everywhere agrees as to the certainty of an approaching business revival and varies only in the predicted time it is destined to arrive.

### Value of Manganese Ore Affected Freight Rate

WASHINGTON, Aug. 9.—Examiner J. Edgar Smith of the Interstate Commerce Commission has submitted a tentative report holding that the rate of \$5.52 per gross ton on shipments of manganese ore from First Ford, Va., to Pittsburgh and Sharpsburg, Pa., in the period from March 3 to June 2, 1919, was not unreasonable. He based his finding on the value of the commodity, which he stated to be about \$2,000 per carload, and recommended that the complaint, filed by C. G. Chevalier, be dismissed. After the shipments, about 20 in number were made, the Railroad Administration reduced the rate to \$4.50 per gross ton. The complainant had suggested that the latter rate be regarded as reasonable and made retroactive. The examiner said that a finding of unreasonableness cannot be predicted upon the fact that a rate was reduced subsequent to the movement at the solicitation of the complainant.

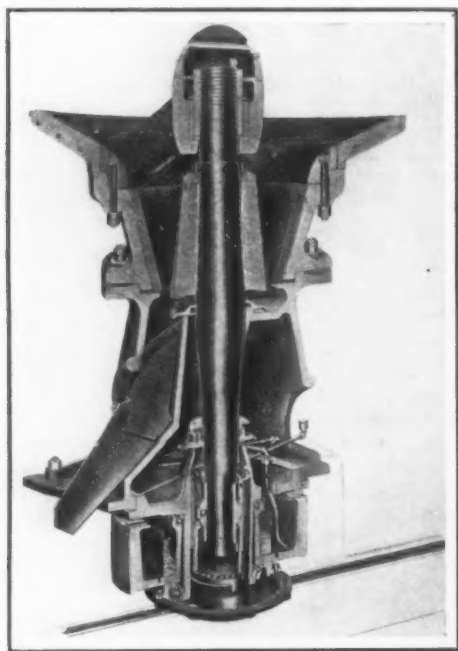
The Harlan plant of the Bethlehem Shipbuilding Co., Wilmington, Del., is arranging for the resumption of work at its car shops, which have not been operated for a number of years past. Initial production will be devoted to the construction of 10 cars for the Huntingdon & Broad Top Mountain Railroad & Coal Co., Huntingdon, Pa.



### Gearless Rock Crusher

Application of the direct drive principle to standard gyratory crushers of all sizes, from the smallest up to and including the No. 60, the largest size of gyratory rock crusher yet built, has been made by the Kennedy-Van Saun Mfg. & Eng. Corporation, 120 Broadway, New York. The machine is said to be simplified, its wearing parts reduced, its power requirements diminished.

The crusher shown contains the ball-joint eccentric, a most important advance in gyratory crusher design, because it maintains alinement of the main shaft and its bearing in the eccentric, and thus eliminates cramping or binding, and consequently prevents heating, high power consumption, rapid wear and loss of eccen-



Sectional View of Crusher, Showing Arrangement of Parts

tricity. The machine has a highly arched spider, permitting the passage of any stone that will enter, and the arrangement of spider ring clear of the top of the concaves, prevents breakage through expansion of the concaves.

The bottom plate sleeve acts as a support for the packed lower dust collar, and as this sleeve does not revolve, the wear on the collar is reduced to a minimum. This sleeve acts also as a support in which the eccentric sleeve and ball are contained, and for supporting the driving dogs. It also forms a journal for the driving pulley, which has ball bearings. The bottom plate sleeve is shouldered on the inside to prevent the eccentric sleeve from moving upward. At the bottom it has a groove and shoulder for receiving the bayonet lock that supports the ball race and pulley.

Made in two parts, the eccentric sleeve is joined by bolts passing through at top and bottom. It has a pocket on the thick side for receiving the locking pin that connects the ball and socket bearing to the eccentric sleeve. This pin, flattened on the sides, provides ample bearing in the pocket, preventing wear. At the bottom, where the eccentric is joined together, it forms a male driving dog for fitting into the female seat.

Driving power is applied through a universal device that eliminates friction and side strain due to the driving of the eccentric, and relieves that grinding and side thrust common to gyratory crushers. Thrust due to pressure against the eccentric is delivered to the eccentric sleeve at the middle of the ball, and thus the eccentric sleeve floats without pressure from top to bottom.

Supported by the bayonet lock method, the pulley is keyed in position. The eccentric is driven by a double male and female connection cast integral with the bottom plate, the latter being bolted to the pulley and the

joint packed to prevent oil leakage. When the pulley turns, both bottom plate and driving dog move, turning the eccentric directly and eliminating pull and side thrust on the eccentric.

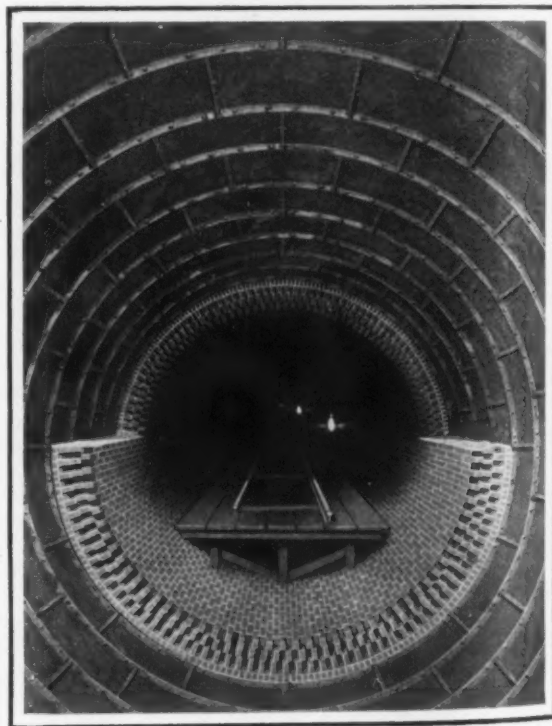
Oil from the eccentric chamber flows freely between the balls, over the top of the pulley hub into the oil well inside the pulley. From this reservoir it is scooped up by centrifugal force and delivered to the top of the eccentric and ball and sleeve. This scoop acts on the same principle as that through which a locomotive in motion scoops water from a canal between the tracks.

As the base of the bottom shell is made square, stone may be spouted in any direction. This enables the operator to set the machine in any position without having to predetermine whether it shall be right hand, left hand or standard. Thus the crusher may be driven from a line shaft by belt or rope drive and the drive pulley can be on the same horizontal plane, or above or below the crusher, as desired.

### Pressed Steel Tunnel Linings

Tunnel liner plates and steel forms for concrete construction have now been designed of pressed steel. The plates consist of flanged sections and they are bolted together, making a continuous rigid shell which can be carried forward a considerable distance in advance of the masonry. They are said to be equally satisfactory if used with brick or concrete. Removable steel forms can be used for the inner face of the tunnel.

It is claimed that by providing this rigid steel lining there result safety to workers, convenience, economy



Pressed Steel Liner Plates Used in Sewers for Detroit, 12 Ft. to 13 Ft. 8 In. in Diameter

and saving in shoring. Tunnelers can keep in advance of the construction forces. These tunnel plates and steel forms are the latest developments of the Truscon Steel Co., Detroit.

Increase of the capital stock of the Moline Iron Works, Moline, Ill., from \$500,000 to \$750,000 was voted recently at the annual meeting of stockholders in the company. Directors for the year were elected as follows: L. E. Nutt, J. J. Creedon, J. T. Miles, L. A. Dorman, C. R. Rosborough, D. E. Miles, B. V. Nutt and M. C. Nutt. Officers were chosen as follows: President, L. E. Nutt; vice-president, J. J. Creedon; secretary, L. A. Dorman; treasurer, J. T. Miles.



## TRADE ASSOCIATIONS

### Administration Asked to Define Allowable Practices in Collecting and Disseminating Statistics

WASHINGTON, Aug. 9.—Authoritative announcement by the Federal Administration regarding trade association activities in particular relation to statistical work is expected to be made in the near future. The suggestion that a statement of this character be issued has been made by the counsel for the National Association of Manufacturers in a letter written on July 25 to Secretary of Commerce Herbert Hoover. The purpose is to obtain a clear idea as to what trade associations may do with respect to gathering and distributing statistical data among members and how the material may be used without violating the law.

The letter to Mr. Hoover invites his attention to a provision of the Census Act of March 3, 1919, calling for the collection and publication of "statistics of products of manufacturing industries," for the years 1921, 1923, 1925 and 1927, and a provision of the act of Feb. 14, 1903, creating the Department of Commerce, providing for special investigation and reports. It is pointed out that discussion of the Secretary with trade and craft organizations representing particular industries now under way is an endeavor to perfect plans so that reports of the kind mentioned may be secured currently and comprehensively. These reports are to be obtained through the Bureau of the Census and it is claimed that this method thoroughly protects by all the safeguards of the general census act the individual activities of any person, firm or corporation making such reports.

The counsel for the National Association of Manufacturers explains that there are a number of trade and craft organizations which represent a substantial proportion of those engaged in a particular line of industrial activity who have, or maintain, statistical bureaus for the collection of trade information of the same general line or character as it is understood Mr. Hoover wishes to secure for the department and the public. The letter continues:

It is common knowledge that there are organizations calling themselves trade or craft associations which represent only a minor portion of such industry and whose activities in statistical and other lines are subject to very proper interrogation by the agencies of the Government as to whether or not their activities are not subject to serious question as being in violation of existing law and wholesome business ethics.

It is believed that it is not difficult for the department to ascertain, in view of the very complete information in the Bureau of the Census as to the total production in different lines of industry, whether an association represents a substantial portion of its particular industry.

It is the judgment of the writer, and in this judgment he is fortified by the opinion of competent counsel, that the single fact of associations collecting and publishing to their members and the public the facts relating to production, sales, shipments, stocks on hand and prices obtained, all of such being a record of accomplished facts, is not in violation of any Federal law. It is recognized, however, that the use made of such information may or may not be subject to legitimate criticism.

It would be decidedly helpful to American industry to have the governmental viewpoint upon these subjects authoritatively stated as early as possible.

The National Association of Manufacturers is interested in the subject only from the general standpoint of American industry, as it neither maintains nor contemplates the establishment of any statistical activity, it being the belief of the association that any such work is properly an activity pertinent to the work of trade and craft organizations.

#### Hoover's Comments on Trade Associations

Secretary Hoover, commenting on the work of the recent conference on statistics of production, said:

"For some weeks the department has been making a careful study of the purposes and activities of trade associations. We find that the vast majority of such associated activity is a constructive contribution to national welfare.

"The department wishes to co-operate with such associations as wish it in the collection of information as to production, stocks of raw and other materials, per-

centage of industry in active operation, total orders, and other accomplished facts of interest to them and in the making of the information available to the whole public.

"The making of such information currently public acts alike to protect legitimate business enterprise and the public interest."

### Lake Ore Movement in July

Shipments of Lake Superior ore from upper Lake ports in July were 4,047,687 gross tons, or 5,590,919 tons less than those for July, 1920, or a decrease of 58 per cent. The total of this season's shipments to Aug. 1 was 10,418,914 tons, which compares with 26,079,111 tons to Aug. 1, 1920. The shipments by ports in July and for the season in 1920 and 1921 are as follows:

	July, 1920	July, 1921	(To Aug. 1,)	
			1920	1921
Escanaba .....	1,174,468	238,258	3,117,277	449,062
Marquette .....	610,321	80,470	1,538,724	133,414
Ashland .....	1,293,239	434,088	3,606,108	961,025
Superior .....	2,249,431	875,005	6,694,927	2,591,235
Duluth .....	2,783,537	1,731,094	7,000,222	4,639,393
Two Harbors ....	1,527,610	688,772	4,121,853	1,644,785
Totals .....	9,638,606	4,047,687	26,079,111	10,418,914
Decrease, 1921 .....		5,590,919		15,660,197

The decrease to Aug. 1, this year, in the season shipments was 15,660,197 tons or 60.04 per cent as compared with last year. Duluth contributed 24.88 per cent of the total against 26.84 per cent a year ago, the Great Northern docks showing an increase this year.

### Lake Iron Ore Analyses for 1921

The Lake Superior Iron Ore Association, Cleveland, has issued its analysis book for 1921, compiled by its secretary, W. L. Tinker. The number of ores listed is 293, as against 290 in the book for 1920. "Mesabi Sinter" appears in the 1921 book, being the ore obtained from the concentration and sintering of the magnetites of the eastern Mesabi district. It is evidently the successor to East Mesabi Sinter of the preceding book. The guaranteed analysis of this ore shows iron, 64 per cent; phosphorus, 0.027 per cent, and silica, 9.00 per cent, as against 63.27 per cent, 0.008 per cent and 10.58 per cent, respectively, according to the 1918 analysis, which applied also to 1919 and 1920.

Technologic Paper No. 192, of the Bureau of Standards, entitled, "Tests of Centrifugally Cast Steel," is now available. Six castings manufactured by the Millspaugh centrifugal process were examined as to their physical and chemical properties including hardness, tensile, impact, density, internal stress, segregation, soundness, and microstructure, both in the condition as cast and after various heat treatments. This investigation shows the possibilities of substituting heat treatment for forging in this type of casting. An abstract of this discussion was printed in THE IRON AGE, May 24, 1921.

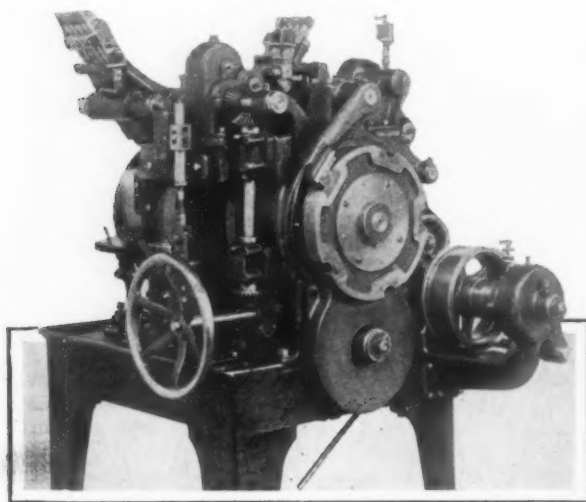
Apprenticeship in Wisconsin has made good progress during the past year despite the industrial depression, according to a report made by the industrial commission. In the year ended June 30, 40 employers were added to the list of those taking on indentured apprentices. In this year 511 boys were indentured, compared with 347 in the previous year. A total of 180 boys completed apprenticeships and were granted certificates. The majority of indentures and certifications are from metal working shops, mainly in Milwaukee.

The United States Government has transferred all the Government owned property known as the Scituate Proving Grounds, Scituate, Mass., to A. A. Brand, Suburban Land Co., Inc., Boston. The property comprises 210 acres and has a mile frontage on the ocean, together with more than fifty buildings and a railroad system.

The Atlas Crucible Steel Co., Dunkirk, N. Y., has posted notices that the local plant will be closed during the month of August, with production to be resumed in September.

## Special Machine for Drilling and Tapping Spoke Nipples

The Langelier Mfg. Co., Arlington, Cranston, R. I., has placed on the market a machine for drilling and tapping automobile wire-wheel spoke nipples having a capacity of 15 to 20 pieces per minute. Nipples are drilled and tapped in gangs of five. There are three heads of five spindles each. The first head drills three-fourths through the work, the second finishes the hole, while the third does the tapping. Nipples are held in position and carried to each head by a five station intermittently revolving drum carrier. The first station is for loading; the second, for the first drilling operation; the third, for the second drilling operation; the fourth, for tapping; and the fifth, for ejecting the nipples from the carrier. All operations therefore are



The Disk Wheel and Snubber Arm Prevent Overtravel of the Carrier and Stop It Before Locking in Position

automatic except that of placing the work in the carrier.

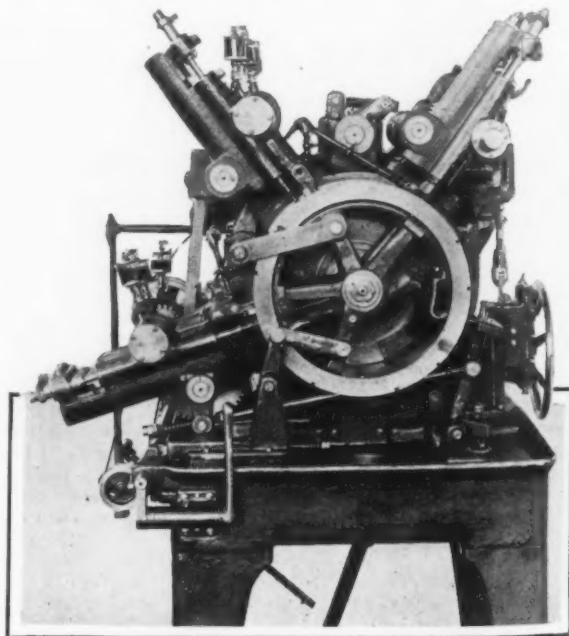
The carrier revolves on a horizontal axis and is moved intermittently to each successive station by a one-tooth driver that engages a five-tooth gear with teeth of special design. To prevent possible overtravel of the carrier and to bring it to a stop before locking in position, a snubber arm is used, which engages a disk wheel with five equi-distant semi-circular notches in its periphery, fastened to the rear of the carrier shaft as shown in the illustration. The snubber engages the notches in the wheel under spring contact and is operated by a separate face cam. The carrier is locked positively and accurately at each movement by a cam operated punger that fits itself successively into five equi-distant, tapered-side, hardened-steel blocks embedded into the periphery of a large disk fastened to the rear end of the carrier.

The operator inserts five nipples in the carrier between each of its movements. Should he not properly seat the square ends of the nipples in the locating bushings, they would project and interfere with the action of the carrier and possibly cause breakage. To prevent this, an automatic machine stop is provided, consisting of an oscillating blade hung inside the carrier and projecting downward sufficiently low to cause improperly seated nipples to come in contact with it when the carrier is in motion. The mechanism for ejecting nipples consists of an oscillating arm carrying a gang of five plungers that push the nipples to the inside of the carrier where they fall into a chute leading to the bed of the machine. This arm operates simultaneously with the feed motion of the first drilling head, the two being connected by a rod. All nipple holders in each station are provided with holding and locating bushings. The carrier itself is made in the form of a drum, one end being open and facing the operator, nipples being loaded with heads up. To prevent these from falling out when the carrier revolves and to provide a resistance for drilling and tapping

thrusts, a hard-steel concentric segment ring, stationed and supported on the end of the carrier shaft, is used inside the carrier.

Drilling and tapping spindles have spiral gear drives, run in phosphor-bronze bearings and their outer ends are held in adjustable sleeves, which can be clamped in the feed yoke heads to proper working positions. Spindles have thrust ball bearings for both directions inside the adjustable sleeves. Feeds for drilling and tapping spindles are actuated from a large double path face cam, which engages with cam rolls on the feed yoke bars. The outer path on the face cam actuates the drill feeds for both the first and second drilling heads and the inner path the feed for tapping spindles, its rate of feed being so timed as to follow the lead of taps when tapping. Drills in the first drilling head have guide bushings for accurate starting and centralization of holes in the nipples. The tapping spindle drive has reverse mechanism with a quick return. The movement of the blade operates a knockout, which in turn actuates a No. 4 Carlyle-Johnson clutch in conjunction with a multiple disk brake.

The main drive of the machine is by a 3½-in. belt on a loose 10-in. pulley mounted on the hub of the friction clutch. From thence the drive is to the worm and gear drive by bevel and spur gearing, belt connection being provided for driving the tap reversing snap mechanism cam. A rotary pump supplies cutting



Nipples Are Drilled and Tapped in Gangs of Five. All operations are automatic except placing work in carrier

lubricant, drawing its supply from the tank after the lubricant has been strained. The machine occupies 46 x 58 in. floor space, stands 66 in. high and weighs approximately 4600 lb.

## Reynolds Spring Co. Expands

The Reynolds Spring Co., Jackson, Mich., maker of automobile products, will build an extension to its Water Street plant, 132 x 204 ft., two stories, reinforced concrete, steel sash, at a cost of \$110,000. It will be ready for occupancy Dec. 1. The company has also installed a trackless trolley system between its Otsego and Water Street plants for its employees, the buses being rubber-tired and getting their power from overhead wires. Watson R. Smith, vice-president Watson Spring Co., will be in charge of building operations. It is planned to increase the present force of 600 employees to 1200. According to the president, July was the best month for the company of any this year, with August promising to be even better.

The American Manufacturers Export Association will hold its annual meeting at the Waldorf-Astoria Hotel, New York, Oct. 5 and 6.



## Manufacturers Denied a Hearing in Railroad Labor Case

Judge R. M. Barton, chairman United States Railroad Labor Board, Chicago, has denied the application of the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association for a hearing in connection with the case of the Federated Shop Crafts against the Pennsylvania Railroad. These three associations desired to have their interests as shippers properly presented in connection with what they consider to be an attempt of the Federated Shop Crafts to require all employees to belong to a union in order to secure representation in dealings between the railroads and their employees on labor questions. The Railroad Labor Board held that to open its doors to the public at large and the many civic bodies having an interest in railroad labor questions would result in delay and prevent the board from arriving at a prompt decision in matters before it. The letter of Chairman Barton added that the board has in mind and fully appreciates the vast shipping and business interests involved in the questions it decides and at all times gives consideration to these interests.

### Increasing Railroad Shop Operations

Since Aug. 1 practically all railroad companies operating in Wisconsin have either reopened or enlarged the working forces of operating shops handling locomotive and car construction and repairs.

At Milwaukee, the Chicago, Milwaukee & St. Paul Railroad Co. is doubling the working hours of the locomotive and car shop, one of the largest operated by the system. The total number of workdays, counting each day worked by each man as one workday, is being increased during August by approximately 35,000 hr. The greatest increase will be in the car department, where 2318 men are employed. These men have been working 10 days a month. During August this will be increased to 19 days, and during September to 20 days. The locomotive shop, employing 1500, will work each present employee 18 days in August, compared with 10 days in July.

At Kaukauna, Wis., the Chicago & Northwestern Railroad Co. recalled 40 men Aug. 1 at a 12 per cent reduction in the former wage. This number of men is 18 per cent of the total laid off April 1. At Janesville, Wis., ten additional men were placed at work in the division shops during the week, with promise of re-employment of a similar number each week during August. At LaCrosse, Wis., the Chicago, Milwaukee & St. Paul increased the working schedule from four days a week to six.

### Increased Labor Efficiency in Akron

The efficiency of workers in the Akron, Ohio, rubber plants has increased over 100 per cent since early last year, according to reports from that city. It is stated that 27,000 employees in the nine largest tire plants are turning out 75 per cent of the production obtained 16 months ago with 72,000 men. One factor in the large increase in production is that the rubber companies in re-employing men have selected the better class of workers, weeding out labor of the floater type.

### More Unemployment in Pennsylvania

Unemployment in the State of Pennsylvania increased further in the last two weeks of July, according to the semi-monthly report of the Pennsylvania State Department of Labor and Industry. The total number of unemployed as of Aug. 1 was 306,635, as compared with 263,000 on July 1. Unemployment in the metal industry is particularly heavy, being estimated at 67,000 workmen. About 64,700 common laborers and more than 46,000 miners also are idle. District offices of the Department of Labor and Industry make the following reports of unemployment as of

Aug. 1 and of July 15: Altoona, 26,335 against 20,850; Erie, 15,200, against 14,775; Harrisburg, 14,405, against 20,850; Johnstown, 20,090, against 19,290; McKeesport, 5275, against 5890; New Kensington, 10,250, against 10,250; Philadelphia, 127,000 men and 11,650 women, against 116,000 men and 11,550 women; Pittsburgh, 55,550, against 50,850; Scranton, 15,130, against 15,375; Williamsport, 5750, against 6650.

### Employment Stationary in Cleveland

There is little change in the employment situation in Cleveland during the past month, according to the monthly survey of the Cleveland Chamber of Commerce committee on labor relations. Reports from 99 manufacturers employing 500 or more persons show that on July 31 there were 54,161 employees on their payroll as compared with 54,165 on June 30. The automobile industry kept up about as well through July as in June, according to employment reports from automobile and automobile parts plants. Eighteen companies in this field had 7463 employees on their payrolls July 31, as compared with 7742 on June 30. The peak, 10,310, was on May 30.

### Increase in Employment in Detroit

Detroit is one of the 27 American cities to report an increase in employment for the month of July, according to the industrial survey of the United States Department of Labor. The statistics indicate that in the month the payrolls of the larger Detroit firms were increased by 7905, an increase of 6.07 per cent over the figures recorded June 30. The figures upon which the computations are based are actual payroll figures from all firms that employ more than 500 workers.

### In the Field of Labor

The allied crafts employed at the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., have taken steps to appeal to Congress through Massachusetts congressmen to secure appropriations which will keep the shipyards in operation.

Effective Sept. 1, wages of all employees, including the president and all other officers, of the Union Twist Drill Co., Athol, Mass., will be reduced 20 per cent. During the war the firm raised wages 10 per cent two times. The plant is closed for a three-week vacation period.

The plants of two implement manufacturers at Louisville, Ky., are operating at only about 10 per cent of normal, while the wagon department of another company is not doing much better, and only about 25 per cent in the automobile and truck departments.

E. F. Holloway, district director of the U. S. Employment Bureau, headquarters at Louisville, Ky., handling Kentucky and several Southern states, in a report released on Aug. 5, shows that unemployment is greatest at this time in the machine, metal working and allied trades, pointing out the very slow conditions at Newport, Covington, Ky., and at points in the South. In Louisville the unemployment situation has not been so bad, due to diversification of industry and absorption. The building trades are shown to be fairly active. No farm labor shortage is reported.

### Sale of Dismantled Naval Vessels

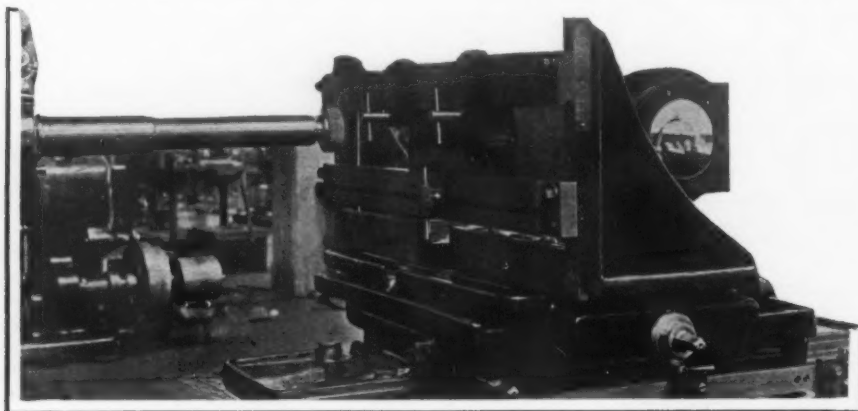
WASHINGTON, Aug. 9.—The Navy Department has sold five dismantled naval vessels from which the metal will be salvaged as scrap. The awards were made as follows: To A. Marx & Sons, New Orleans, cruiser Cincinnati, \$15,100; gunboat Castine, \$12,500; to Barde Industrial Co., Seattle, Wash., cruiser Minneapolis, \$36,000; cruiser Marblehead, \$11,100; to H. A. Hinter's Sons Co., Philadelphia, cruiser Raleigh, \$10,800. The cargo steamer Supply was offered for sale, but no bids were made for it.



### Cylinder Block Regrinding Jig

A jig for holding automobile cylinder blocks while being reground, taking the place of the jig heretofore manufactured, is being marketed by the Heald Machine Co., Worcester, Mass. It is adaptable for the company's No. 55 and No. 60 internal grinders, and for the No. 65, a manufacturing machine.

The new jig is known as Universal Quick-Locating and is designed to eliminate the necessity of using the knee to raise and lower the work to the correct position for the grinding operation. It is of cast iron and furnished in but one size, 41 in. It bolts to the grinding machine table and is provided with two bars, each 3 in. wide by 1½ in. thick, the lower bar being dovetailed for holding a bracket and diamond. The upper bar has a zero or indexing marker on each end, which is used with a graduated scale on both sides of the



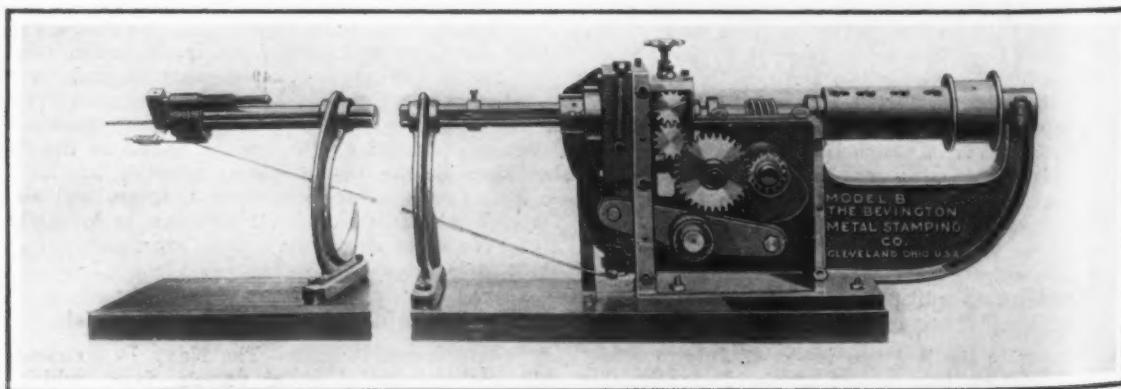
The Indexing Marker and Graduated Scale on the Upper Bar Facilitate Locating the Cylinders to Correct Position for Grinding

jig. A set of locating brackets movable horizontally and having removable pins of sufficient length and strength to support a cylinder block is also provided for the upper bar.

To operate, the workman first measures the diameter of the cylinder hole, which, let us say, is 4 in. The top bar is then set so that the zero or indexing line on each end is opposite the 4-in. graduation. The bar is then clamped and the locating brackets moved, so that the pins will be about the same distance apart as the two end holes in the cylinder block, after which the block is rested on the two pins and clamped in place. This will bring the center of the hole to be ground to the correct height for the grinding spindle to enter. The pins are then removed and the locating brackets slid out of the way of the grinding wheel.

### Wire Straightening and Cutting Machine

The Bevington Metal Stamping Co., 1545 East Eighteenth Street, Cleveland, is marketing an auto-



Bearings Are Interchangeable and of Bronze Except Those for the Arbor, Which Are Ball Bearings

matic wire straightening and cutting machine having a capacity for wire ranging from 5/32 in. in diameter to No. 20 Washburn & Moen gage. Various other sizes are also furnished, to handle wire from 1/64 to ¾ in. in diameter and in various lengths to suit the length of wire to be cut.

The features claimed for this machine are its sim-

plicity, noiseless running and freedom from vibration. All bearings are interchangeable and of bronze, except those for the arbor, which are ball bearings. It is pointed out that because of the interchangeability of bearings, repairs can be easily and cheaply made. Gears are cut from steel and the feed rolls and cutting dies are of heat-treated tool steel. The straightening dies are of gray iron, wood, babbitt or brass, depending on the wire to be handled. The machine is driven by a ¼-hp. motor.

### Industrial Activities in New England

The P. A. F. Corbin division, American Hardware Corporation, New Britain, Conn., has increased its working schedule from 32 to 40 hr. weekly, and reduced wages of employees from 18 to 28 per cent.

The Alaska Freezer Co., Winchendon, Mass., has

resumed operations after being idle for two weeks. The plant is on full time.

The Gilbert & Barker Mfg. Co., Springfield, Mass., heretofore operating 46 hr. a week, has resumed a 48-hr. week schedule, but with a reduced number of employees, who have accepted a slight reduction in wages. The management states the business outlook in the company's line is good, and some additions to the working force may be necessary before long.

The Groton Iron Works, New London, Conn., has completed the last contract on hand and will immediately reduce its working force.

The New London Ship & Engine Co., Groton, Conn., has released altogether about 60 workmen because it has completed contracts on submarines S-19, S-20 and S-21.

The General Electric Co., Lynn, Mass., last week reduced wages of 12,000 employees, effective Aug. 8. The cut varies in amount, according to the different classes of workers. Of the 12,000 employees, 4671 who, prior to June 30, 1921, completed five years' service,

received \$171,765 last week in supplementary compensation. This sum represents 5 per cent of the company's earnings for the half year ended June 30.

The Warner & Swasey Co., Cleveland, resumed operations Aug. 1 on a three day week schedule. This company's plant was shut down July 1.

# German Small Tool Prices the Lowest

Twist Drills Sold at 50 Per Cent Less Than British Product—British Compete with United States and Germany Only on High-Speed Tools

BY PAUL M. TYLER

GERMAN competition has again developed as a dominant factor in the European supply of twist drills, reamers, milling cutters and other classes of small tools, both in plain carbon and high-speed steel grades. This competition is especially serious in view of the fact that there are fairly large accumulations of stocks, particularly of American carbon tools, in England, and because of the general trade depression that restricts consumption to a minimum. Whereas in the latter part of 1920 deliveries were the leading factor, price has now become the main consideration and German manufacturers are able to quote figures considerably below the costs of manufacture in other countries. The writer's observations on a recent trip to Europe were confined mainly to England and Belgium and in these countries (up to the end of June, at least) the actual deliveries of German tools had been practically negligible, due partly to the prejudice against the purchase of articles from a former enemy country and partly to uncertainty over the operation of the reparations recovery bills pending in both these countries. German tools, however, were stocked by merchants and enjoyed a fair share of what little trade was being done.

## Catering to the Buyer

In addition to the low prices they are able to quote, German manufacturers are aided in their attacks on

foreign markets by the favorable credit terms they allow. A large proportion of the orders are placed subject to approval on delivery and without any advance payments. The German firms are also ready to make up samples with the merchant's name stamped on the product and with no reference to the fact that they were "made in Germany." One merchant in Brussels wrote to a German manufacturer asking bids on a variety of tools and almost by return mail received a complete set of samples each marked with his name and address, although he had never had any previous business relations with the German firm. In Cologne, also, the writer found an agent of one of the large German twist drill manufacturers who claimed that he could furnish any reasonable quantity of these tools from stock and mark and pack them in such a way as to give the impression that they were made in the United States or other countries. While German lists are made up on the basis of diameters in millimeters, English sizes can be obtained from stock at the same price as the next higher metric size. There seems to be no difficulty in obtaining export licenses and payments are ordinarily to be made in marks at current rates of exchange. New price lists were issued early in 1921 and the usual "discounts" are 200 per cent above list less 20 per cent (to dealers) on sizes above 10 mm. (say 3/8 in.) on carbon tools and 150 per cent

COMPARATIVE TABLE OF TWIST DRILL PRICES  
Taper and Straight Shank Twist Drills (Carbon)

Diam., Inches	Taper and Straight Shank					Taper Shank			Straight Shank		
	American		English		Equiva- lent* Each	German		Equiva- lent* Each	German		Equiva- lent* Each
	List Each \$	Net Each \$	List Each s. d.	Net Each s. d.	\$	List Each Marks	Net Each Marks	\$	List Each Marks	Net Each Marks	\$
1/16	.60	.26	2 6	1 7.5	.33	3.05	7.3	.12	2.0	4.9	.08
1/8	.80	.34	3 6	2 3.3	.46	3.8	9.0	.15	3.2	7.7	.13
3/16	1.20	.51	5 0	3 3.0	.65	4.9	11.9	.19	4.5	10.8	.18
1/4	1.60	.68	6 9	4 4.6	.88	7.8	18.8	.31	6.0	14.4	.24
5/16	2.00	.86	8 3	5 4.1	1.07	9.9	23.8	.40	9.3	22.3	.37
3/8	2.60	1.11	11 0	7 1.8	1.23	12.6	30.2	.50	12.6	30.2	.50
7/16	3.50	1.50	14 9	9 7	1.92	17.4	41.8	.70	17.4	41.8	.70
1/2	5.50	2.35	23 0	14 11.4	2.99	27.0	64.8	1.08	27.0	64.8	1.08
5/8	8.50	3.63	35 6	23 9	4.62	45.3	108.7	1.81	45.3	108.7	1.81
3/4	12.50	5.34	52 3	33 11.6	6.79	61.5	147.6	2.46	61.5	147.6	2.66
7/8	18.50	7.91	77 3	50 2.5	10.04	81.0	194.4	3.24	81.0	194.4	3.24
1	24.50	10.47	102 3	66 5.5	13.29	109.5	262.8	4.38			
1 1/8	30.50	13.04	127 0	82 9	16.55	144.0	353.6	5.89			
1 1/4	38.00	16.25	158 6	103 3	20.61	180.0	432.0	8.63			
1 3/8	48.00	20.32	200 0	130 0	26.00	232.5	558.0	9.30			
1 1/2	65.00	27.79	271 0	176 1.8	35.23	279.0	669.6	11.16			
1 3/4	85.00	36.34	354 0	230 1.2	46.02	335.0	804.0	13.40			
2	112.00	47.88	467 0	303 6.6	60.71	408.0	979.2	16.49			
2 1/4	140.00	59.85	583 0	378 11.4	75.79	462.0	1108.8	18.48			
2 1/2	200.00	85.50									
2 3/4	260.00	111.15									
3	400.00	171.00									

Taper and Straight Shank Twist Drills (High Speed)

Diam., Inches	List Each \$	Net Each \$	List Each s. d.	Net Each s. d.	\$	List Each Marks	Net Each Marks	\$	List Each Marks	Net Each Marks	\$
1/16	1.10	.84	6	4 7.8	.93	14.40	28.80	.48	7.75	15.50	.26
1/8	1.50	1.14	6 6	5 4.5	1.00	16.25	32.50	.54	12.90	25.80	.43
3/16	2.00	1.52	8 6	6 7	1.32	21.00	42.00	.70	20.65	41.30	.69
1/4	2.50	1.90	13	10 9	2.02	41.00	82.00	1.37	34.25	68.50	1.14
5/16	3.50	2.66	16	12 4.8	2.48	56.00	112.00	1.87	55.65	111.30	1.86
3/8	4.75	3.61	20 6	15 10.64	3.18	77.50	155.0	2.58	77.50	155.0	2.58
7/16	6.25	4.75	26 6	20 6.45	4.11	105.65	211.3	4.19	105.65	211.3	4.19
1/2	10.75	8.17	44	34 1.2	6.82	177.50	355.0	5.92	177.50	355.0	5.92
5/8	17.25	13.11	76	58 10.8	11.78	268.75	537.50	8.96	268.75	537.50	8.96
3/4	25.00	19.00	104	80 7.2	16.12	391.25	782.5	13.04	391.25	782.5	13.04
7/8	35.00	26.00	140	118 6	23.70	544.0	1088.0	18.13	544.0	1088.0	18.13
1	45.00	34.20	185	143 4.5	28.68	734.0	1468.0	24.47			
1 1/8	65.00	49.40	240	186	37.20	989.0	1980.0	33.00			
1 1/4	85.00	64.60	315	244 1.5	48.83	1283.0	2566.0	42.77			
1 3/8	105.00	79.80	400	310	62.00	1669.0	3338.0	55.63			
1 1/2	135.00	102.60									
1 3/4	165.00	125.40									
2	195.00	148.20									
2 1/4	225.00	171.00									

\*Foreign prices converted at £1 = \$4, and 60 marks = \$1.

above list less 20 per cent (to dealers) on all classes of high-speed steel tools.

#### German Prices Half the British

Representative prices will be found in the accompanying table, and it will be noted that the German prices will average less than one-half British prices, even on the basis of the exchange rate of 60 marks to the dollar prevailing in the early part of June when the quotations were made. The differences are most marked in the case of carbon drills, but are very large even in the case of high-speed steel drills, especially in the smaller sizes where the raw material is a less important item in the cost of manufacture and the advantage of cheap labor is obtained to a greater degree.

In comparing the prices as given in the table, it should be noted that the prices are all quoted at manufacturers' or merchants' warehouses in the countries named. The German prices must be increased by approximately 7½ per cent on the basis of f.o.b. Ham-

close conjunction, so far as prices of high-speed steel tools are concerned, with the High Speed Steel Association. The majority of the small tool makers in England do not make their own steel, although most of the larger ones use steel from only one works. The tendency toward obtaining ownership of steel works, however, has been marked and recently several firms have absorbed tool steel plants in order to assure themselves of a supply of steel and, in the case of high-speed steel, to obtain a better market for their scrap. Even when owned by the same interests, the tool steel works are rarely adjacent to the small tool factories.

#### Milled and Composite Drills

In England, twist drills are almost invariably milled from the solid bars, although at least two firms are licensed to manufacture them from a twisted section and produce a small quantity for use in the shipyards for non-precision work. In the largest sizes of high-speed drills, rarely under 1½ in., some makers produce a drill which has only the tip made from high-speed steel which is attached by means of a brazing compound to a carbon steel shank and flutes, and inserted tips of high-speed steel are occasionally employed in lathe tools—either brazed on or fitted into a slot in a bar of carbon steel. Generally speaking, however, English tools are made of the same metal throughout. Most of the high-speed tools, both in England and on the Continent, contain only 14 per cent of tungsten, the higher grades being furnished only on special order. It is not common to specify the tungsten contents and the special steels are sold by brand names. On the basis of tungsten powder at 2s. and ferrotungsten (80 to 85 per cent) at 1s. 7d. per pound of tungsten contained, the prices of high-speed steel in England in July, 1921, were 3s. per pound for the usual 14 per cent grades and 3s. 9d. per pound for 18 per cent, with some special grades selling a few pence higher. Taking sterling exchange at \$3.60, these prices correspond to 54 cents and 67.5 cents, respectively, per pound.

#### British Carbon Drills Not Competitive

Methods of production do not call for special comment. While a fair proportion of the equipment in the older British works is out of date, the new equip-

Straight Shank Twist Drills  
Jobbers' or Short Lengths  
CARBON

Diameter, Inches	American			English			Equivalent U. S. Money, * Each	German			Equivalent U. S. Money, * Each
	List, Dozen	Net, Dozen	Net, Each	List, Dozen	Net, Dozen	Net, Each		List, Each	Net, Each	Equivalent U. S. Money, * Each	
1/16	1.80	.77	.06					0.55	1.5	.02	
1/8	3.25	1.39	.12					1.18	2.8	.05	
3/16	6.00	2.58	.21					2.42	5.8	.10	
1/4	12.00	5.13	.43					3.9	9.4	.16	
5/16								5.3	12.5	.21	
3/8								7.8	18.7	.31	
HIGH SPEED											
1/16	5.90	4.48	.37	1 5	1 2.9	.25	3.6	7.3	.12		
1/8	7.35	5.59	.47	2 5	2 1.4	.42	6.0	12.0	.20		
3/16	10.50	7.98	.67	4 3	3 8.7	.74	9.5	19.0	.32		
1/4	20.00	15.20	1.27	6 0	5 3.0	1.05	16.7	33.5	.56		

\*Foreign prices converted at £1 = \$4, and 60 marks = \$1.

burg and a trifle more for delivery in Belgium, France, or England. Before reaching the consumer in any of these countries, there will be added also a middleman's profit, as few if any of the German firms have established direct agencies abroad. For this reason most of the German tools that have been exported so far have been plain carbon steel, and English manufacturers have enjoyed a practical monopoly in the sale of high-speed steel tools of all kinds. The prices of American high-speed steel tools have been so high that the only sales of this class have been a very limited range of specialties.

Prior to the war, the European market for carbon steel cutting tools was shared mainly by American and German manufacturers, the former doing the larger share of the business in England, while German makers enjoyed the bulk of the Continental trade. There were a number of British manufacturers of carbon tools, but the output was small and most of the home requirements were imported. With the more general adoption of high-speed steel, the manufacture of small tools became a more important industry in England, but it developed mainly as a branch of the high-speed steel industry. The extraordinary demands for tools for use in the manufacture of munitions resulted in a rapid expansion in the output.

#### British Manufacturers' Associations

Altogether, there are now probably nearly 50 self-styled manufacturers of twist drills and perhaps an even larger number of makers of milling cutters in England. Most of the output, however, comes from about 20 fairly large firms, all of whom are members of a group of associations which govern prices. Among these are the British Twist Drill Manufacturers' Association, the Milling Cutter Association and the Screwing Tackle Manufacturers' Association (taps and dies), all having headquarters in Sheffield and operating in

Bit Stock Drills (Carbon)

Diam., Inches	American			German			Equiv. U. S. Money, * Each
	List, Dozen	Net, Dozen	Net, Each	List, Each	Net, Each	Marks	
1/16	3.00	1.03	.09	3.60	8.64	.14	
1/8	5.00	1.75	.15	3.70	8.88	.15	
3/16	8.50	2.91	.24	4.15	9.96	.17	
1/4	13.00	4.45	.37	5.25	12.60	.21	
5/16	18.00	6.16	.51	7.50	18.00	.30	
3/8	24.00	8.21	.69	9.60	23.04	.38	
7/8	30.00	10.26	.86	12.25	29.40	.49	
1	36.00	12.31	1.03	16.10	38.64	.62	
1 1/8	42.00	14.36	1.20	19.00	45.60	.72	
1 1/4	48.00	18.24	1.52	23.50	56.40	.92	

\*Reckoning 60 marks = \$1.

ment that was put in during and since the war is almost identical with that employed in the United States; in fact, much of the machinery is actually of American manufacture and in some cases American firms have laid out the factories and installed the machinery. Production costs at some of these new plants should compare favorably with those of American manufacturers, even in the case of carbon tools. But with few exceptions, in spite of the lower wage scales, since the scale of production is much smaller than that maintained in American plants, the costs at British works are too high to allow extensive competition with American or German firms except in high-speed steel tools.

#### French Tools in England

There is some production of small tools in France and French tools are offered in London at prices a little lower than those quoted by American and British firms, but this is believed to be merely a result of purchases at a favorable exchange rate, as sales are



from stocks in England. There is at least one manufacturer of tools in Belgium, but Belgian production is a negligible factor even in the home consumption of that country and the development of any considerable export trade is out of the question. The Austrian firms that enjoyed some export business before the war do not appear to have resumed operations as yet and are not a factor in the post-war situation.

#### Germany's Low Labor Cost

The situation apparently resolves itself into a struggle between American and German manufacturers for

the business in carbon tools and between British and German manufacturers in the rapidly expanding market for high-speed steel tools of all kinds. When it is realized that few German mechanics receive more than 80 marks per day and most of the operators of machines manufacturing these classes of tools are paid less than 70 marks (say \$1) per day, it would seem that Germany has an overwhelming advantage in production costs. It is absolutely impossible to get figures as to the exportable surplus of German works, but for the present they are able to supply a relatively large volume of foreign business and stocks are accumulating.

## GERMAN ECONOMY MOVEMENT

### Combination of Engineers and Industrialists Under Government Auspices to Study Wastes

BERLIN, July 19.—Under the name of National Board for Economy in Industry and Trade, an organization has been formed at Berlin under the auspices of the Ministry of Economics and with the co-operation of leading industrialists. It is a combination of the various forces at work for the increase of production by the elimination of waste in labor and material. Its principal executive organs are the Society of German Engineers and other large technical and economic organizations. This endeavor for greater economy in industrial production originated in the standardization movement in German engineering, which has lately spread to other industries. It was found that mere standardization would not solve the problem, and in 1920 steps were taken to enlarge the operation schedule by treating such subjects as working of materials, mechanical and individual means of production (tools, machinery, and psycho-technics, time studies, etc., respectively), plant operation (works transportation, energy and heat economics), and works organization. The Government appointed a commissioner for industrial economics, who is now to be superseded by the newly-founded institution, it being recognized that such problems should be handled by self-governing bodies set up by the industries.

#### Active Support by All Industries

So far the center of gravity of the whole movement has been in the machine industry, while the extension of activities to other industries is in the course of development. A large number of industrial branches, as, for instance, engineering works, forging plants, foundries, metal working plants, paper mills, etc., are already in collaboration with the different sub-organizations and other industries (pottery, textile, chemical) are engaged in preliminary preparations. The Government has sanctioned a grant of 1,000,000 m. and an equal amount has been contributed by industry. The trades and industry are lending active support by technical contributions, research, experiments, investigation of special subjects, and the delegating of representatives to meetings.

#### Wide Range of Subjects Considered

Some of the principal subjects considered, apart from scientific management, standardization and typification, are the following:

Working of aluminum; investigation of steels and lighter metal suitable for measuring instruments; possible retrenchments in the consumption of copper and alloys; cheapening of production by improving certain special machinery; improvements in the design and construction of hand tools; collecting of data for the elimination of non-productive manual operations; scientific plant layout, with special attention to mechanical transportation; agreements on technical formulæ, usages, etc. For the technical training of laborers, artisans and engineers a network of local organizations is being spread over Germany. With the co-operation of a large number of firms, touring exhibitions are being arranged, and the establishment at

Berlin of an experimental and model institute for the training of works officials has been decided upon. Another organization just being formed and based on similar principles will devote its attention to the study of rational utilization of waste and old material.

#### Merger of German Locomotive Works

Another big merger has taken place in the German engineering industry, which possibly may form the nucleus of a powerful locomotive combination. At a meeting of the board of directors of the Rheinische Metallwaren-und Maschinenfabrik at Düsseldorf it was decided to establish a community of interests with the Allgemeine Elektrizitäts Gesellschaft (A. E. G.) at Berlin, the Friedrich Krupp Aktien Gesellschaft and the Cologne iron trading firm of Otto Wolff, and to increase the capital stock of the company by 95,000,000 m. to 120,000,000 m., at the same time providing for a further increase by 50,000,000 m. as a reserve for extension of the plant. This merger will place the Rheinmetall, as it is generally called, among the leading locomotive works of the world.

#### Wage Rates Low Abroad

Figures given on page 1692, THE IRON AGE, June 23, for wages paid labor in the iron and steel and allied industries abroad, compared with wages paid in the United States, are amplified by the full report now issued by the Committee on Ways and Means, House of Representatives, Washington, from whom a copy of the 103-page pamphlet, dealing with many industries, may be obtained on request. Some of the outstanding features gleaned from the report follow:

<i>Wages per Day</i>	1913-4	1919-20	<i>Place</i>		
<b>Foundry:</b>					
Skilled labor.....	\$1.92	\$0.60	Germany		
Semi-skilled .....	1.40	0.52	Germany		
Unskilled .....	1.03	0.45	Germany		
Skilled .....	...	1.53	France		
Semi-skilled .....	...	1.15	France		
Unskilled .....	...	1.02	France		
Skilled labor .....	...	1.67	Austria		
<b>Iron and steel mills:</b>					
Highly skilled .....	{ 2.12	2.00 }	France		
	{ 2.90	3.20 }			
Skilled workers .....	{ 1.55	1.28 }	France		
	{ 1.93	1.52 }			
Common labor .....	{ 0.68	0.96 }	France		
	{ 0.89	1.28 }			
<b>Rolling mills:</b>					
Skilled .....	2.09	0.65	Germany		
Semi-skilled .....	1.54	0.60	Germany		
Unskilled .....	1.32	0.52	Germany		
 <i>Wages per Week</i>					
Blast furnace and rolling mill average .....	...	\$43.12	U. S. A.		
Steel mill workmen .....	...	9.96	Japan		
Iron and steel common labor ..	...	12.52	England		
Iron molders .....	...	{ 15.46 }	England		
	...	{ 17.40 }			
Coppersmiths, ship .....	...	18.27	England		
 <i>Rates per Ton in Bar-Iron Plants</i>					
	1895	1907	1913	1920	
Puddlers .....	...	\$2.33	\$2.74	{ \$7.50 }	England
	...	...	...	{ 8.27 }	
Puddlers .....	\$5.50	...	...	16.00	U. S. A.

Application for a Pennsylvania charter will be made Aug. 8, for the T. E. Malone Co., Pittsburgh, which will engage in the manufacture and sale of foundry facings, equipment and supplies. Thomas E. Malone, formerly secretary of J. S. McCormick Co., Pittsburgh, George R. McAleenan and John Jackson are interested in the new company.

# New Type of Induction Electric Furnace

## Primary Winding Above Bath—Experience with 2-Ton Unit—For Refining Molten Metal and Serving as Holding Reservoir and Melting Ferromanganese

**T**HE General Electric Co. has developed and placed in full commercial operation for test purposes an improved induction type of electric furnace. While the induction furnace is in principle a transformer, much more space than usually exists between the primary and secondary circuits is necessary because of required heat insulating material between the primary and the secondary. As a result the reactance is, unavoidably, comparatively large. This means that, unless the power supplied to the furnace is of low frequency, it will operate at low power factor. While a low power factor would not materially affect the energy consumption in a certain process, a low power factor furnace would be more expensive. Furnaces

the ring from crucible, they say, may be considered as a bundle of an infinite number of strands of current carrying elements and they thus are mutually attractive and pull together and the electromagnetic force tends to change the cross-section to circular. To obtain a true circular section would require an infinite force, so that in practice only the upper surface of a normally rectangular section will be curved or rounded off. This attracting force acts only on particles carrying current, and particles less conducting, as, for example, oxides, slag and gases, are therefore forced out to the circumference, i.e., a separation takes place, as in a centrifugal separator.

If the metal section should be restricted at some place, the current density becomes greater there and so also the attracting force. The result of this is that the liquid becomes agitated and if the restriction or the current is great enough, the agitation will be so great as finally to break the circuit. This phenomenon is usually referred to as the pinch force of the pinch effect.

The secondary or the "bath" forms a loop, and the current density and consequently the magnetic flux density are no longer uniform, being greater on the inner face of the loop. The attracting force is, therefore, strongest along the inner face of the loop and this causes, on the exposed surface, a slope of the metal as well as a circulatory motion in planes perpendicular to the direction of the current, as illustrated in Fig. 2. In practice the section of the bath will not be entirely uniform and this is desirable as, due to the attracting or pinch force, the metal will be caused to move in

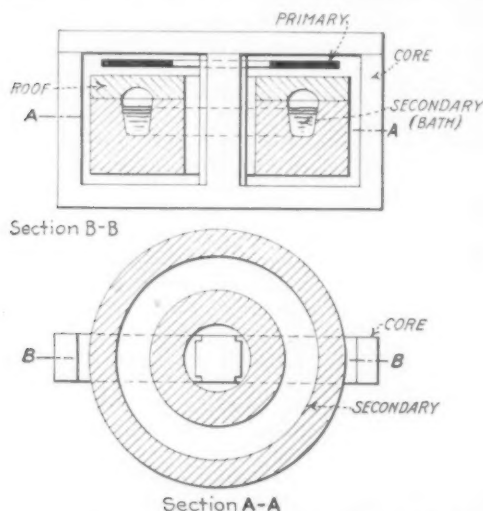


Fig. 1—Diagram of General Design Which Shows the Location of Primary Winding Above the Bath or Secondary Winding

are, therefore, generally designed for lower frequencies than what is standard among central stations.

In the new furnace the primary winding is located above the crucible where it is entirely out of danger in case the metal should leak out of the crucible. It is surrounded by a non-magnetic metallic casing which gives mechanical protection, and also acts as guide for the cooling air which is brought in at the bottom of the furnace so as to flow along the center leg of the core and out horizontally over the winding. The casing, being grounded, also serves to protect the operator against accidental contact with the primary circuit. The winding with its casing is attached to the upper leg or top yoke of the core so that this unit can be detached and removed from the furnace.

The crucible is of simple ring form giving substantially constant cross-section for the charge which is accessible by means of two or more lateral doors.

The roof is of unit construction, bricks of suitable shape being bridged across an outer and inner steel ring. With this construction, the roof, it is found, can be made tight and can be removed from the furnace in a short time. The furnace, it is added, can be built stationary or tilting in several well known ways.

According to a description prepared by M. Unger and C. A. Scharschu, of the General Electric Co., the metal in the induction furnace is subjected to certain electromagnetic forces, which are two-fold, an attracting force and a repelling force; that these forces are not of a small magnitude, but are, on the contrary, quite considerable.

The attracting or pinch force they describe in part as follows: The current carrying liquid conductor of

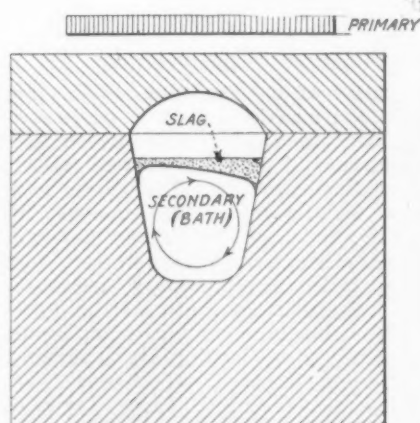


Fig. 2—Diagram to Illustrate How the Mutually Attractive Elements of the Secondary Bring About a Circulation Within the Bath and the Repellent Force Between Primary and Secondary Drives Downward the Current Carrying Bath so That the Slag Collects at the Top

direction parallel to that of the current. This motion is, however, according to Messrs. Unger and Scharschu, very gentle but sufficient to produce uniformity of the metal.

Of the repelling or centrifugal force they say: When adjacent conductors are carrying current in opposite directions and they are free to move, they will move away from each other, or, in case one of the conductors is liquid, it may be forced against the retaining wall. The primary circuit being over the bath circuit, the current carrying elements of the bath are,

consequently, repelled toward the bottom of the crucible, thus forcing the impurities to the surface as indicated in Fig. 2.

The combined effect of the electromagnetic forces acting upon the bath of the induction furnace of such a design is consequently as follows: The metallic or current carrying parts of the bath are forced toward

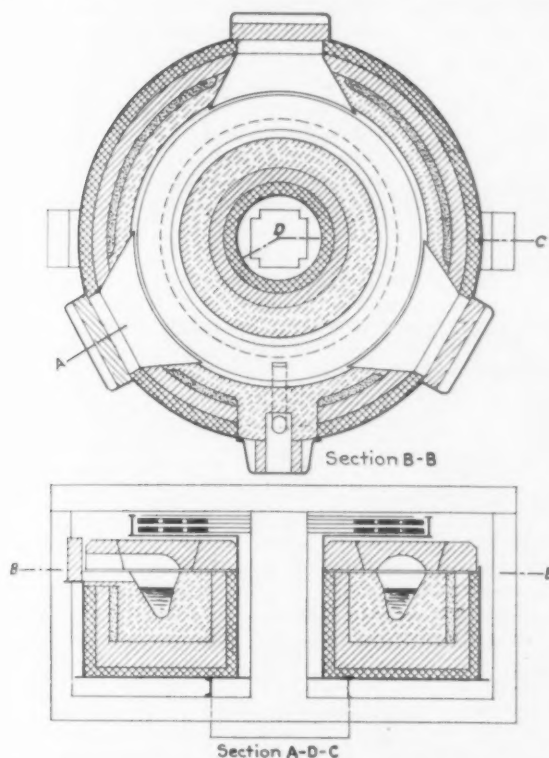


Fig. 3—The 2-ton Steel Induction Furnace Has Three Charging Doors

the center of the conductor so that impurities are squeezed out radially. The metal is also repelled toward the bottom of the crucible causing impurities to rise to the surface. The bath is, furthermore, subjected to circulation; one circulation in vertical planes, perpendicular to the direction of the current and another in horizontal planes in the direction of the current. The former circulation is generally far more pronounced than the latter which can, however, be increased by tilting the furnace, thus purposely making the cross-section of the bath uniform.

To operate the furnace, the secondary must be a closed ring or circuit, as otherwise no induced current can flow and there will, consequently, be no heating. The first charge must consist, therefore, of a metal ring of steel or of whatever metal it is desired to melt. The ring must be homogeneous and of fairly large section to avoid rupture from the pinch force at the time it commences to melt down. A positive method to avoid this trouble is to pour some molten metal over the ring shortly before it commences to melt. Another equally satisfactory method is to use two rings, one of lower melting point than the other, such as cast iron and steel. As soon as the ring is melted down, the furnace may be charged up to full capacity and metallurgical processes started. A certain amount of metal must always be left in the furnace after each pouring so as to hold the electric circuit complete. This, of course, does not apply in case liquid charges are used, as in duplexing.

It is not possible to start the furnace by using a charge of metal scrap or borings or graphite as the contact resistance becomes too great for the induced current to reach a sufficiently high value for heating.

In discussing the power supply the authors point out that it is usually necessary to install a motor-generator set for each furnace to transform the poly-phase standard frequency supply into single-phase low frequency power. By regulating the field excitation of the generator of the set, the power can be varied as desired. The load required being steady the power

factor of the furnace is of no interest to the central station as it does not affect the power supplied to the motor-generator set. So far as the central station is concerned, the induction furnace load is polyphase, high power factor, standard frequency and therefore an ideal one.

A 2-ton induction furnace has been in operation at the Pittsfield works of the General Electric Co. for over a year. It is rated 250 kw., 2200 volts, single-phase, 15 cycles with a hearth capacity of 4000 lb. of steel. The general design of the furnace and part of the installation is shown in Figs. 3, 4, 5 and 6. For the refractory and heat insulating material the General Electric Co. has developed for this purpose a refractory called "furnite." The roof is made from firebricks of special shapes, built up as a unit between two steel rings as shown in Fig. 4.

The furnace is provided with four doors, one of which is used exclusively for pouring. A so-called tea-pot pouring spout, as shown in Fig. 4, is used for pouring the metal entirely from below the slag line. The doors are not airtight, and, for the purpose of better control of the furnace atmosphere, the furnace is piped up for gas; one  $\frac{3}{4}$  in. gas pipe entering the crucible on each side of the three charging doors. By providing lateral doors as shown in Fig. 3, the entire bath is accessible, and slagging operations can be carried out with a minimum of effort.

The 4000 lb. charge forms a ring about 6 ft. diameter, 8 in. deep and 11 in. wide at the top. The charging doors are about 2 ft. wide and 10 in. high. The furnace occupies a floor space of about 12 x 12 ft. No water cooling is used. The available power is 2200 volt, 60 cycles, 2-phase and this is, by means of a motor-generator set, converted into 2200 volt, 15 cycle single-phase power. A 7.5 hp. blower set is provided for the furnace, and a small blower for the generator.

The furnace has, so far, been used almost exclusively for reclamation of different grades of steel scrap. The scrap is delivered either pressed in bundles or in form of small pieces and this is melted and refined in the furnace and poured into ingots.

The lining consists of two parts; the brick or per-

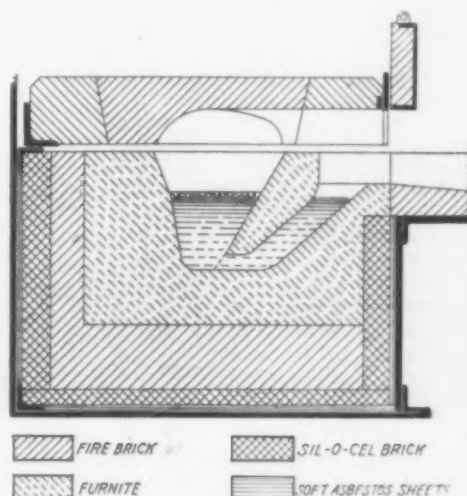


Fig. 4—The Pouring Spout Connects as Indicated with the Lower Part of the Bath and the Section Drawing Shows How the Refractory Material is Built Up

manent lining and the rammed or replaceable lining. A layer of asbestos sheet is placed around the sides and bottom of the furnace shell before the brick lining is put in. The brick lining is made up of one layer of sil-o-cel bricks around the sides and bottom of the furnace laid up as tightly as possible with a lime-silica bond. Three layers of circular fire bricks are put in the bottom of the furnace and one layer around both the inside and the outside shell. The bricks on the inside wall are laid up with fire clay as tightly as possible, whereas in the outside wall, the bricks are laid loosely so as to allow for expansion. This kind of brick lining serves the purpose of heating insulation



and to support the rammed lining.

The rammed lining is made up of basic material known as "furnite" with a binder of pitch. The rammed lining is put into the furnace in the following manner: A sheet metal cylinder is placed inside the outer brick wall of the furnace and is held at about 2 in. from the brick wall by means of steel spacers. Batches of furnite of approximately 1000 lb. are heated to about 70 deg. C. and mixed with warm pitch. This mixture is spread evenly around the bottom of the furnace, giving a layer between 1½ in. and 2 in. thick, and by means of air rammers the layer is rammed quickly into place. Successive layers are added and rammed before the preceding layer has had a chance to become cold, and after the lining has reached a depth of about 7½ in. it is quickly leveled by means of a straight edge and spirit level and the crucible and pouring spout forms are put in place. Both forms are made of cast iron, the crucible form being washed with kerosene to prevent the lining from sticking. The pouring spout form is allowed to remain in place and is melted down with the starting rings. A thin layer of lining material is put around the forms and tamped into place by hand rammers so as to make a perfect bond with the lining already in place. Successive layers of lining material, approximately 2 in. thick are rammed into place by air rammers until the top of the furnace is reached.

The crucible form, steel spacers and metal cylinders are then carefully removed. The space left between the

The combination starting ring gives a molten charge of about 1700 lb. The bath is covered with lime to which is added sufficient fluorspar to make it pasty and sufficient mild steel scrap to bring the charge up to 3500 lb. As low carbon steel is made, iron ore is used to reduce the carbon and the oxidizing slag is withdrawn through the slagging door to remove the phosphorus. The slag is removed in 5 to 10 min. A new lime slag is added (75 lb. lime and 1 lb. spar) and the alloy additions are then made. In about ½ hr. thereafter, 2000 lb. of the charge is poured into an ingot, leaving about 1500 lb. of metal in the furnace.

One ton of metal is poured every 3½ hr. with an average energy consumption of 750 kwhr. in the furnace and 950 kwhr. at the bus bars, which includes power for the crane, lights, etc., and losses in the motor-generator set and the blowers. When melting down scrap which is in such form that the entire charge of one ton can be put in the furnace at one time, the energy consumption at the bus bars was low-

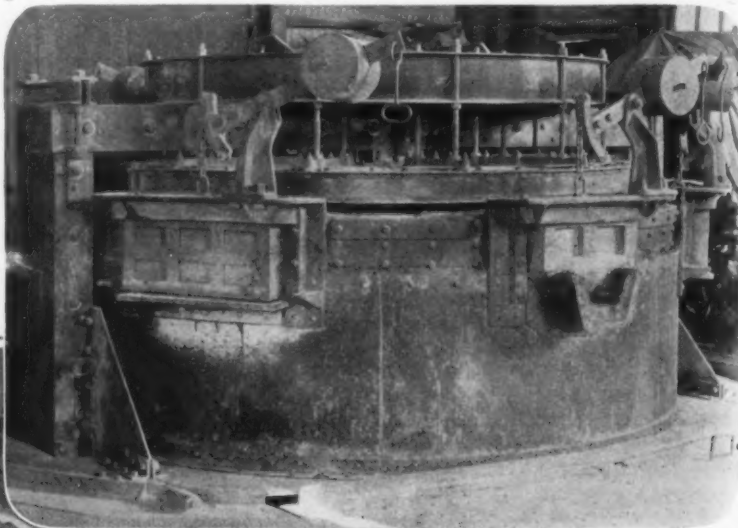


Fig. 5—Above, 'Induction Furnace Completely Erected

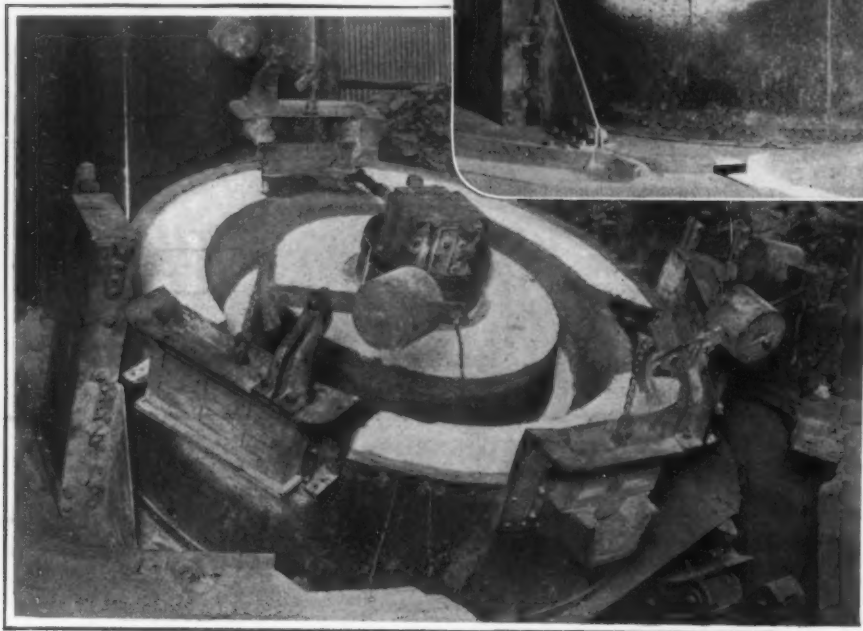


Fig. 6—At Left,—Top Removed, Rammed Lining is Shown in Place

outside brick wall and the rammed lining is loosely filled with granular calcined magnesite, the doors are cut down to proper level, the starting rings are put in place and the roof and top yoke with the coils placed on the furnace.

To put in the rammed lining requires about 12 hr., the labor being about 75 man-hours. With the exception of a skilled man to supervise the ramming of the lining, unskilled labor is used.

Starting rings of cast iron melt down safely in about 30 hr. The cast steel rings require somewhat longer time, whereas a combination of cast iron and cast steel rings are melted in about the same length of time as cast iron rings. The cast iron ring weighing about 400 lb. is put in the bottom of the crucible and the cast steel ring of about 1300 lb. is placed on top of the cast iron ring. The cast iron ring melts first and the cast steel ring sinks into the molten pool of metal, thus automatically repairing any break which may occur in the cast steel ring. Starting rings are of course used only when a new lining is put into operation.

ered from 950 to 775 kwhr. per ton of metal poured, and the time per heat from 3½ to 2¾ hr.

#### Copper Precipitates on Iron

Extensive experiments carried out by the Chemische Fabriken Weiler-ter-Meer at Uerdingen have shown that in the electrolytic copper plating of iron by the well known process of immersing the wire in a copper sulphate bath, the adding of a small quantity of glue or gelatine had yielded very satisfactory results, an addition of as low as 0.1 per cent of glue having already proved sufficient. It is claimed that, from the viewpoint of economy and reliability, the new process is superior to the old ones.

Liquid fuel is now used on 2536 steamships listed by Lloyd's, the total gross tonnage being 12,797,000, or an average of more than 5000 tons per ship. Seven years ago only 364 steamers were listed as equipped for burning oil fuel, their gross tonnage being some 1,310,000, or an average of about 3300 tons per ship.

# Sources of Waste in Building Industry

Duplication of Effort, Poor Management, Slack Production and Arbitrary Labor Regulations, All Blamed

**H**ALF a billion dollars a year in wages is being lost in the building industry through unemployment, it is asserted in a report made public by the Committee on Elimination of Waste in Industry, of the American Engineering Council. Lack of work is declared to be the outstanding fact in this industry, whose critical condition following the war is attributed primarily to high costs of construction.

The committee's investigation covered the entire country, special attention being paid to representative cities such as New York, Boston, Philadelphia, Baltimore, Chicago, Cleveland, Atlanta and San Francisco. The inquiry into the building industry was made as a part of a national assay of waste conducted by the committee, of which J. Parke Channing of New York is chairman and L. W. Wallace of Washington vice-chairman. This assay originated with Herbert Hoover, who recently retired from the presidency of the American Engineering Council, and embraced six leading industries. The building investigation was in charge of Sanford E. Thompson of Boston, who directed a large force of field workers. An abstract of the report follows.

Waste is causing huge losses in building which, including all trades and common labor incidental to it, ranks second among the industries, and contributes to the wealth of the nation more than \$3,000,000,000 yearly. Yearly averages for the past six years show that 32 per cent of the activities of the industry, which employs some 3,000,000 mechanics and laborers in a single year, is devoted to residential buildings, and 18 per cent to industrial buildings, "miscellaneous" covering the rest.

## How the Waste Originates

Chief among the sources of waste in the building industry are irregular employment, inefficient management and wasteful labor regulations. Customs or conditions prevailing throughout the industry, and poorly designed equipment, are given as secondary causes. The annual economic loss due to accidents is estimated as high as \$120,000,000. Application of safety methods, it is stated, would save to the industry 12,000,000 days a year.

Loss through duplication of estimates and designs, and duplication in bidding, runs into the millions. An acute national shortage of housing exists, with costs prohibitive to householder and banker. Improvement in production per man is noted as a result, in part, of weeding out war's misfits. Many union rules are condemned as absolutely wrong. Both employers and employees are blamed for restriction of output.

Haphazard management in planning and controlling work, and lack of standards, which often double the labor cost, characterize most construction undertakings. But a few builders, recognizing the waste in money and man power, are adopting methods that approach modern factory management.

The building trade workman is busy on the average about 190 days in the year, or two-thirds of his time. A few contractors, individually or associated, are attacking this problem with effective results. The public also must be educated to the need of a sensible distribution through the year of its construction requirements. Development of methods of conducting work in cold weather and arrangement of work to provide indoor operations in cold and stormy weather will help here. Idleness, however, is not due entirely to seasonal demands; strikes and lockouts are appreciable causes.

## Labor Troubles Most Potent in Wastefulness

One of the great economic wastes to be found in the building industry is the strike. The waste to the men engaged, the contractor and the public is hard to estimate. The major causes of strikes are demands

for increase in wages, recognition of the union, decrease in working hours, and jurisdictional disputes. Incidental to these causes and often aggravating them are working conditions, while in almost every case the prime factor is a lack of understanding and failure of the employers and the workers to get together.

From 302 in 1914, the number of strikes and lockouts in the building trades increased to 452 in 1919, an advance of 50 per cent. This increase is accounted for in part by the greater demand for labor in 1919, which inevitably makes the requirements of workmen more exacting and arbitrary. Of the 452, only 18, or 4 per cent, are listed as "lockouts," so that the waste due to lockouts is relatively small.

If the Massachusetts strike rate of 138,519 working days lost in 1920 is applied to the entire industry, a waste of some 3,000,000 days per year is found. If the greatest cause, the demand for an increase in wages, could be eliminated, strikes as a factor of waste would shrink into insignificance. The remedy that suggests itself is co-operation. Management and labor must forget the sore spots of past conflicts and, through wholehearted co-operation, fix by proper studies a minimum wage to correspond with a standard amount of production, with additional compensation for additional output. This would furnish an incentive to the men and would give recognition to deserving mechanics.

## Restriction of Output Due to Union Rules

Union regulations have produced enormous losses through direct or indirect restriction of output. Workmen and contractors, however, are beginning to appreciate that reduced output reacts in tremendous fashion upon themselves. Wasteful labor regulations consist of requiring skilled men to do work that could be performed by unskilled, restricting individual incentive through requiring uniform wages, limiting the number of apprentices, excessive reduction of working hours, restricting output by prohibiting the use of labor-saving devices, and jurisdictional regulations, which distribute certain types of work to different trades, frequently without regard to expense.

It must be recognized that the unions are by no means alone in their restriction of output. Contractors and builders and supply dealers affect the situation indirectly by maintenance of high prices, collusion in bidding and unfair practices. Collusion between unions and employers also has sometimes raised prices unduly.

One great fundamental cause for low output is the fact that all members of unions in the same trade are paid the same wage. It has been found that, on construction jobs, there are usually a few men who do one-third more work than the average. These men also do better work. Is it fair that these good men receive the same wage as the others? Restriction of apprentices in many cases is extreme and unfair. Overtime and travel rules, also, tend to increase building costs unduly.

Despite the restrictive action of many of the union regulations there is growing evidence of willingness to co-operate, especially in Philadelphia and San Francisco. In Cleveland co-operation in tile setting was hindered by employers. Co-operation in the needle trade of Montreal is cited as an example for the building industry.

## Heavy Losses Involved in Accidents

In some construction trades accidents involve losses up to 10 per cent of the labor cost, in addition to the human loss of lives and energy. The average loss, computed from insurance statistics, is about 2½ per cent of the labor cost. Here also certain contractors have found it possible to cut their accidents in half, through special efforts.

In Massachusetts, during one year, accidents caused



a loss of 485,486 days. In New York State, where four times as many workers are employed in the factories as are employed in building and construction work, there were more fatalities due to accidents in building than in factories during a 4-year period. Accidents are largely caused by carelessness of the workmen, or lack of ordinary safeguards. Conditions which would not be tolerated in a factory for 24 hours are found on every job.

#### No Lack of Demand for Buildings

The total shortage of housing in 1921 is found to be 53 per cent of the total square footage (the real measure of value) constructed in 1915. To this percentage must be added, if we consider the footage constructed in 1915 as equal to the requirements of that year, 7½ per cent, as an increment to cover the increase in population. The need for building is most evident. Costs are so high, however, that the householder cannot afford to buy, nor can the banker loan money, because of the danger of loss through the inevitable fall in prices. Income tax conditions have forced funds once available for mortgages into tax-exempt securities.

#### Loss Occasioned by Labor Turnover

Large fluctuations in the number of men employed by representative contractors indicate a great fluctuation in the volume of business carried on. Assuming that the figures for unemployment, due to all causes, in the building trades in Massachusetts are representative of the entire country, and if one-half of this unemployment could have been eliminated, the value to the building industry or its wealth to the country would have been increased as follows: 1915, \$106,000,000; 1916, \$91,000,000; 1917, \$113,000,000; 1918, \$85,000,000; 1919, \$141,000,000; 1920, \$192,000,000.

Representative average conditions in the building trades of Philadelphia and vicinity reveal lost or wasted time as high as 44 per cent among iron workers, 37 per cent among cement finishers, 36 per cent among steam fitters, plasterers' helpers and stone cutters, 40 per cent among roofers and 29 per cent among painters and paper hangers. This percentage is based on the relation of the average days worked per year to the number of effective days possible.

The days at work average 189 per year for the various trades in Philadelphia. The average of estimates reported by contractors is 210 working days a year. Over half of the lost time is laid to bad weather and the balance chiefly to waiting for or looking for work. An extreme example of labor turnover in Philadelphia is the case of a man who, in the course of 5½ years worked for 76 different contractors and was hired 108 times. This enormous turnover causes losses to both employers and men.

#### How the Unions Can Help the Industry

Unions must co-operate to the extent of eliminating the flat rate for all mechanics of a trade, and of modifying the restriction that forbids mechanics to accept piece work. With definite standards fixed, and with the co-operation of both parties, fair incentives can be introduced. The most encouraging sign in the elimination of the above causes is found in what is known as the "Philadelphia Plan," put forth by the labor element of that city, under which a committee, composed of an equal number of representatives from groups of employer and employed, would constitute a tribunal or council.

General failure of the building industry as a whole to develop and use a greater amount of mechanical equipment is scored. Greater strides have been made in almost every other industry in the application of mechanical means. Union objection to labor-saving devices is wrong in principle and will be relegated to the past, like the restriction of output.

Architects frequently cause expensive delays, and occasionally complete shutdowns, by failure to deliver detail plans and specifications at the proper time. Waste of time and energy and money through duplication of estimates and of designs runs into millions every year. An equal, if not greater, source of waste is said to be the duplication in figuring quantity by all bidders.

The most encouraging feature in the building industry to-day is the action of a few of the builders, and a few groups of building trade workmen, in making intensive studies of the causes and remedies for irregular employment and haphazard conditions of work. Along with this is the growing appreciation on the part of both labor and management that, to build more buildings and maintain high wages, it is necessary to attain greater and greater productive capacity per man.

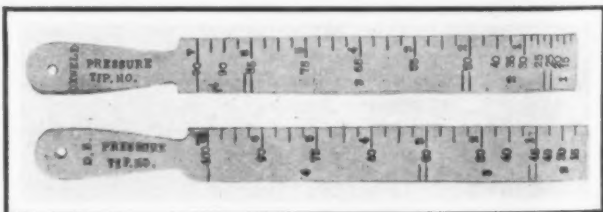
Never in the history of our country was it so important that certain fundamental principles of economics—principles which are not mere theories, but are based positively on facts—should be accepted and established as a working program. These principles will throw overboard the fallacy that restricting production can make work go further, and will supplant this with the knowledge that to get, one must give; that to receive, the equivalent must be given in money or in time or in effort, and that increased returns can be attained only through increased production.

#### Handy Aid for Oxy-Acetylene Cutters

A handy aid for the use of metal cutters who use the oxy-acetylene blowpipe has been devised recently by K. McDermott, steam engineer and assistant mechanical engineer of the South Chicago Works of the Illinois Steel Co. It is in the form of a nickel-plated hand rule about a foot long and 1½ in. wide and ¼ in. thick, graduated to indicate tip sizes and oxygen pressures best suited to cutting steel sections of any thickness.

The Illinois Steel Co. uses two different makes of blowpipes and as a common scale would not apply to both, one side of the rule is graduated for one type and the other side for the other. By a proper computation of scale a workman's rule can easily be made for any make of blowpipe. The manner of using the device is simple. Instead of reading thickness in inches and fractions, one reads tip size and pressure, thus rendering unnecessary any resort to memory or reference to a cutting table.

The new device is found to be a time saver and insurance against error and waste if the scale is read cor-



rectly. Any one can easily make his own cutting rule suited to the equipment used, as the idea is not patented.

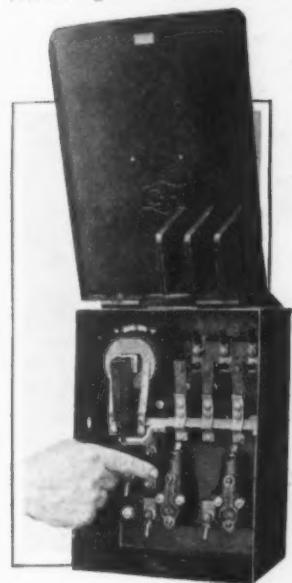
#### Stockholders of Hame & Chain Company Sue Officers and Directors

Minority stockholders of the National Hame & Chain Co., operating at New Albany, Ind., a large plant, have filed suit against officers, directors and majority stockholders, charging gross mismanagement of the company, payment of large salaries and bonuses, and refusal to pay dividends to minority stockholders, although there is a surplus of \$150,000 available. The suit names George D. Todd, former mayor of Louisville, Ky., president; Laura D. Todd, vice-president; J. Gault Fulton, secretary, and Arthur Loomis, treasurer. It is held that officers hold 670 of the 1000 shares of stock. The suit is brought by Joseph Burghard, owner of 300 shares of stock, and Joseph and Austine Burghard as executors of the estate of Ernest R. Burghard, deceased. It is held that officers holding majority of the stock have had control for two years, and will not even allow minority stockholders to investigate the books, and have dissipated assets in an effort to force the minority stockholders to sell.



## New Automatic Starter for Motors

The Cutler-Hammer Mfg. Co., Milwaukee, Wis., has developed a new 9604 automatic starter for small squirrel cage motors to allow a large starting inrush for several seconds, but at the same time to give protection against burnout troubles. Two mercury over-



Two Mercury Overload Relays Eliminate Fuse Troubles

load relays mounted below the contact fingers, as shown in the illustration, are designed to eliminate all fuse troubles and the attendant expense, while allowing momentary overloads and overloads as high as 25 per cent for a limited period.

The new overload relay consists of a glass tube carrying a mercury column which forms a part of pilot circuit of the magnetic switch coil. A portion of this column is surrounded by a heating coil or thermal element. This element is in series with the motor circuit and is heated in the same proportion as the motor windings. Excessive current passing for too long a period heats the coil, causes the mercury to boil and the vapor to pass up

into a chamber at the top of the tube. This action breaks the liquid mercury column and opens the circuit to the magnet coil. As this coil is de-energized, the contact fingers drop away and disconnect the motor from the line. After such an interruption, the mercury cools down, becomes liquid again, drops back into the tube so that the pilot circuit to the magnet coil is complete when the control button is depressed. In other words, the relays quickly reset themselves. The motor will not start, however, until the control button is depressed after the relays have reset.

As the functioning of these overload relays depends upon the temperature at which mercury will boil, the current required to operate the relay increases with the decrease in the temperature of the surrounding air. In other words, if the motor and the starter are installed in a cool location, the relay permits a greater starting current or a higher overload than if the temperature of the surrounding air were higher. If the motor and starter are located in an unduly hot place, the mercury relays will act in the place of a thermocouple.

The push button station which is supplied with C-H 9604 starters can be installed in any position that is most convenient for the operator. The starters may be used in connection with machinery driven by squirrel cage motors of comparatively small horsepower, 7½ hp. and less.

## Court Proceedings of Walden Worcester, Inc.

In recent proceedings brought by Walden Worcester, Inc., Worcester, Mass., against the American Grinder Mfg. Co., Milwaukee, Wis., for the cancellation of the latter's trade-mark "Blackhawk," the United States patent office has rendered a decision favorable to Walden Worcester, Inc., the patent office examiner holding that Walden Worcester, Inc. (who is proprietor of the trade-mark "Tomahawk") has been injured by the registration of the trade-mark "Blackhawk."

Walden Worcester, Inc., has also recently instituted suit in equity in the Federal District Court of Wisconsin against this same company for alleged unfair competition, and trade-mark and patent infringements. C. N. and F. W. Jonas Brothers of Chicago, San Francisco and Los Angeles are made joint defendants. C. N. and F. W. Jonas Brothers at one time were selling agents in the West for Walden Worcester.

## July Steel Ingot Output Very Small

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in July of 803,376 gross tons as compared with 1,003,406 tons in June. The decrease was 200,030 tons or 19.9 per cent. Estimating the production of other companies on the basis of those reporting, the total output of ingots in July was 954,128 tons or 38.126 tons per operating day, counting 25 working days in July against an estimated total of 1,191,693 tons, or 47,667 tons per operating day, in June. This is a decrease of 237,565 tons or 9,541 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

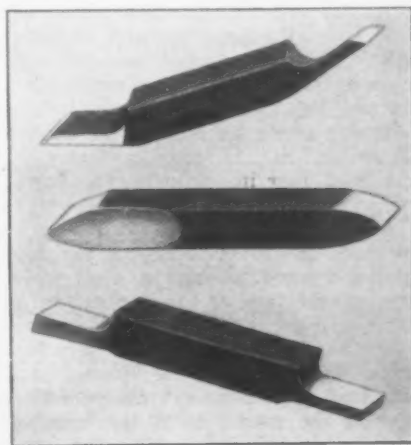
	Open Hearth	Bessemer	All Other	Total
January, 1920...	2,242,758	714,657	10,687	2,968,102
February .....	2,152,106	700,151	12,867	2,865,124
March .....	2,487,245	795,164	16,640	3,299,049
April .....	2,056,336	568,952	13,017	2,638,305
May .....	2,251,544	615,932	15,688	2,883,164
June .....	2,287,273	675,954	17,463	2,980,690
July .....	2,135,633	653,888	13,297	2,802,818
August .....	2,299,645	695,003	5,784	3,000,432
September .....	2,300,417	693,586	5,548	2,999,551
October .....	2,335,863	676,634	3,485	3,015,982
November .....	1,961,861	673,215	3,594	2,638,670
December .....	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2,203,186
February .....	1,295,863	450,818	2,796	1,749,477
March .....	1,175,591	392,983	2,404	1,570,978
April .....	1,000,053	211,755	2,150	1,213,958
May .....	1,047,810	216,497	1,543	1,265,850
June .....	808,286	193,644	1,476	1,003,406
July .....	689,489	113,312	575	803,376

The July ingot production was at the yearly rate of 11,857,186 tons, counting 311 operating days to the year. This compares with a rate in June of 14,824,437 tons, in May of 17,980,465 tons, in April of 17,242,773 tons and in March of 21,258,405 tons.

The decrease of 237,565 tons in the estimated ingot output of all companies in July from that in June compares with a decrease of 200,278 tons in the July pig iron output from that of June.

## New England Tool Bits

The New England Tool & Machine Co., 51 Taylor Street, Springfield, Mass., has placed on the market tool bits, manufactured under a patented process, to fit standard tool holders taking square stock, in the following sizes:



Thread Tools are Ground On a Special Block

3/16 in., ¼ in., 5/16 in., ¾ in., 7/16 in. and ½ in. These tools are cut from annealed bars. The thread tools are ground on a special block and the flat and angles on the U. S. standard threads are ground with the same operation, proper clearance being allowed. They have a

cutting edge on both ends and are offered to the machine shop trade with a view to cutting down production costs by eliminating time spent by workers in grinding tools. Their size permits checking in and out of tool cribs as are drills and other tools, thereby eliminating loss sustained in tool bits as usually handled in the shop.

## Vertical Turning and Boring Mill

The vertical turning and boring mill shown in the accompanying illustration is being offered by the Jones Machine Tool Works, Philadelphia, in 60, 72, 84, 100, 120 and 144-in. sizes.

One of the outstanding improvements incorporated is the push button control for starting and stopping the motor. Other levers are conveniently located on each side of the machine. The drive is by a constant or variable speed motor, the constant speed motor giving 16 changes of speed through the change speed box. From the motor the drive is through heat-treated steel sliding change speed gears, miter gears and pinion to the large steel ring gear, which is bolted to the under side of the table.

The table runs in an annular flat-shaped bearing of large diameter constantly lubricated, and is driven by the steel spur gear. The table spindle is supported in vertical bronze bearings located in the main base. The top vertical bearing is cone shaped, adjustable for wear, and the lower bearing is straight with the lower end supporting the step bearing. This is composed of alternate layers of bronze and steel washers which run in oil and are used for raising the table off the annular bearings when machining small, light work at high speeds. The housings are of box-girder pattern, bolted to the base and tied together by the bridge, which also supports the elevating mechanism.

The crossrail is of the three-track type, the saddle screws being located between the two lower tracks, the worm shafts for operating the rams being between the two upper tracks. The crossrail is clamped to the inner and outer guides of the housings and is raised or lowered through steel screws and bronze nuts by power from a motor on the bridge. The saddles are fitted with clamps and bronze taper gibs for taking up wear, also a clamping screw for locking the saddles to the crossrail when the ram is feeding. Operation is by hand ratchet feed for fine adjustment; power feed or quick traverse through steel worm and bronze nut. The rams are scraped and fitted in saddle swivels, which are made to swivel 30 deg. either side of vertical by ratchet wrench through a steel worm and worm-gear segment, the face of the segment being graduated in degrees to indicate the angle. The rams can be operated by hand-ratchet feed, power feed or quick traverse through a steel worm and bronze worm gear, steel pinion and rack. Counterweights are located in the rear side of the housing. Clamping screws are provided for locking the rams when saddles are feeding. Tool holders are from steel forgings and have a taper shank, straight shank being furnished if desired.

Change speed gears are of 0.60 to 0.70 carbon heat-treated steel and are of the sliding type, positive, no friction clutches being employed except when the machine is belt driven. Shaft bearings are bronze bushed and all parts inside the speed box run in a bath of oil. The table is stopped in any position by throwing the power off by foot brake when the machine is belt

driven, or by an electric brake of the solenoid type when motor driven. Feeds for saddles and rams are independent for each side of the machine, and safety friction clutches are provided to prevent breakage in case the saddle or bar become jammed. The rapid power traverse driving shafts receive power from the motor on the bridge, and the operating levers are at each end of the crossrail. They are independent for operating each side of the machine.

## New Export Organization

The Associated Machinery Corporation, recently incorporated with capital stock of \$50,000 by four manufacturers of contractors equipment, has opened an office at 50 Church Street, New York, in charge of

Charles L. Langlotz. The company will act as an export selling agent to India, Burma and Ceylon for the Pawling & Harnischfeger Co., Milwaukee, Wis., electric traveling cranes, ditchers, excavators, etc.; the Chain Belt Co., Milwaukee, Wis., chain, water screens, concrete mixers, sprockets, elevators and conveyors; the Insley Mfg. Co., Indianapolis, Ind., clamps and excavators, and the Novo Engine Co., Lansing, Mich. The branch in India will be in charge of Lionel R. Vinall-Moon,

who recently sailed for India to establish the first office of the company at Rangoon. Both Mr. Langlotz and Mr. Vinall-Moon were formerly associated with the Allied Machinery Co., New York, the former being in the New York office and the latter the representative in India.

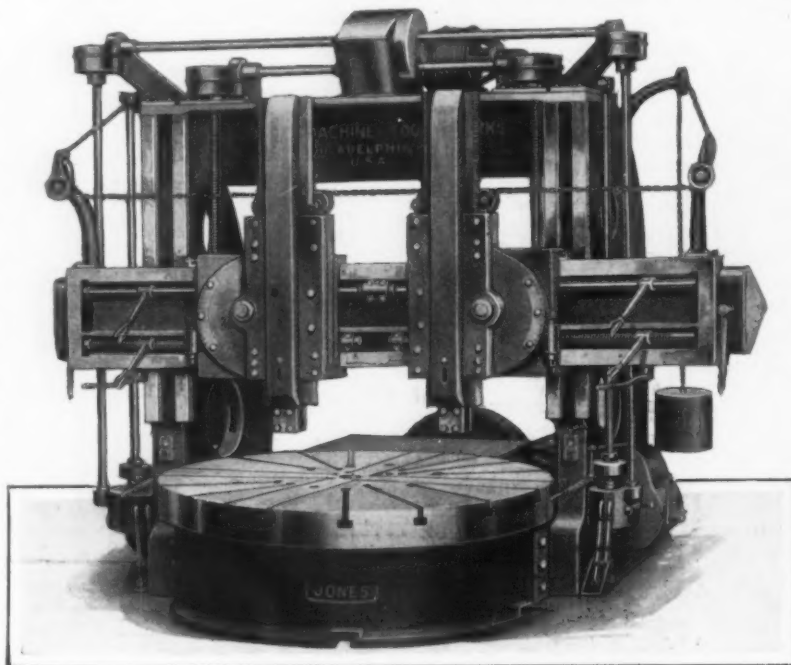
## Ford Motor Co.'s Furnace Breaks Its Record

Last month blast furnace A of the Ford Motor Co., Dearborn, Mich., broke its previous records for tonnage and coke consumed per ton of iron. Average tons per day, 509.8; coke per ton of iron, 1981 lb.; average silicon 2.85 per cent; average sulphur, 0.029.

The Central Pennsylvania Coal Producers' Association has addressed another letter to John Brophy, president of district No. 2, United Mine Workers of America, asking for a joint conference on or before Aug. 5, the purpose being to discuss the wage reduction question. Past invitations of the operators for a conference have been turned down by Brophy on the ground that the requests did not specify the reason for the meeting.

The Rolls-Royce Co. of America, East Springfield, Mass., plant closed July 29 for five weeks or until Sept. 6. A month ago the company employed 800, but at the time of closing the number had been cut in half. Early in July the plant was closed two weeks.

Tilley & Brown, metal heating engineers, Plainfield, N. J., have been awarded the contract for the new mold and core drying oven and fuel oil system in the plant of the Monel Metal Products Corporation, Bayonne, N. J.



Push-button Control for the Driving Motor is a Feature. The table runs in an annular flat-shaped bearing constantly lubricated

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ESTABLISHED 1855

# THE IRON AGE

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## Steel Prices and Costs

Much light on the condition of the railroads has been shed by tables and charts showing the disposition of "the railroad dollar." The *Railway Age* of July 30 had a full-page colored chart on this, with another showing the total receipts and disbursements. An appraisal of the condition and prospects as to steel prices would be greatly aided by a similar presentation, but this is impossible because the figures are not reported. In the case of railroads the official reports furnish the necessary data.

Anyone at all familiar with the business of producing steel, however, can make some rough estimates that will be enlightening. The object, of course, is to gage present prices for steel and see upon what foundation they rest. THE IRON AGE composite price of finished steel products that comprise 88 per cent of the total output of the country in finished steel stands at 40 per cent above the average in the ten years ended June 30, 1914. The two largest parts of the iron and steel industry's dollar are wages and freight rates. If a 30-cent rate for common labor becomes standard, that will be 58 per cent above the 19-cent rate paid in 1914, but a still higher percentage above the average rate paid in the ten-year period on which the 40 per cent increase in steel prices is figured, for wages had been advancing more or less steadily from a 13-cent rate in 1898. As to freight rates, they are up from 75 to 100 per cent. General supplies for mills, furnaces, mines and coke works are up by large percentages. Coal at mine is up much more than 40 per cent. The Steel Corporation's taxes, outside of Federal taxes, increased about 125 per cent from 1913 to 1920, while its property account as shown on the balance sheet increased less than 10 per cent.

As to the part of the iron and steel industry's dollar that goes to "capital," the Steel Corporation's report for 1913, a year with earnings 17 per cent greater than the average in the ten-year period on which the steel price comparison is based, showed 28 cents out of each dollar received from the public as making up bond interest, sinking funds, depreciation and extraordinary replacements (some of which represented labor and freights ultimately), dividends and surplus.

While these references are not complete and precise they show increases in necessary expenditures so much greater than the increase in market prices that it is clear the steel industry is much worse off with the prices of to-day than it was during the ten years before the war. If the experience of those ten years is a criterion, steel prices to-day are considerably below a normal relation to the cost of production. That is a condition as to prices that was to be expected by reason of the lightness of demand and the strenuous character of the market competition. The point is that the condition has arrived. It is not something that is expected to be developed in future by further price declines.

Before the war steel prices went below the average and above the average. Already they are below the normal relation, and the only remaining question is how much farther below the normal they can go, until one of two things occurs, or both—an advance in prices or a decrease in costs, represented in wages, freights and other expenditures.

## Sentiment and Business

As a nation we have been very prone to overwork certain words, a practice that represents loose habits of thinking or at least loose habits of speaking. The words "optimism," "sentiment" and lately "normalcy" have been used rather too much. Optimism is a trait of character, its antonym being pessimism. Given the same set of facts, the optimist views them one way, the pessimist the other way. Yet men use these words to indicate the character of facts, not the character of the man who views the facts.

Then as to "sentiment," the word is commonly used in the form that sentiment is better or sentiment is worse, the actual meaning being that men appraise business conditions as better or worse. It may be held that this diffusive way of speaking does no harm, because people understand what is meant. It does do harm, because unconsciously if not consciously men associate "sentiment" with what the word really means. One of the dictionary definitions of the word is "a judgment permeated or prompted by feeling." We do not

wait that in business. When it is said that "sentiment is better" in business we want it to be that the calm and deliberate judgment of business men, not influenced by sentiment, is that the fundamental conditions of business have improved. If, for instance, the taking out of building permits has increased, the amount of debits to individual accounts at banks has grown, the freight ton-mileage of the railroads is heavier, and the volume of orders received by sellers is larger, it is much better to say that these conditions have improved than to remark lamely that men who have observed and analyzed these things are displaying "a better sentiment."

What American business needs is to study facts. It has been misled all too often by its feelings, and it has helped itself do this by overuse of such words as optimism and sentiment. Secretary Hoover recognized this at the outset in his work in the present cabinet, and purposes to give business all the concrete information that can be made available as to actual commercial movements and conditions. In this program there will be no statistics of the number of pessimists and optimists who were in business, on an average, during the ten years before the war, and the relative proportions month by month at the present time, and no graphs of the amount by which the judgment of business men is "permeated or prompted by feeling."

Another word often used harmfully is the word "waiting." We are told that there is a "waiting" market. Originally, perhaps, the word was introduced into market nomenclature to suggest, as to a dull market, that it was not permanently dull, that the condition was only temporary. If that was the motive, it was good; but with a careless habit of thought and expression we have fallen into the way of picking on the first thing that comes to mind, though preferably something that cannot occur soon, and then glibly saying that the market is waiting on that. Just now it is a reduction in freight rates. Nobody knows that men in general are waiting for that event and a canvass of individuals might fail to find a single man who was waiting to act in his own business until freight rates were reduced. Yet we say business is waiting on the rate reduction and thus close our minds to the possibility of an improvement in business before that time, which may be six months or more in the future.

A measure of the effect of the war and submarine destruction on the world's shipping industry is afforded by a comparison of British and American steel plate exports before and since the war. For 1912 and 1913 the two countries shipped out 11,450 tons and 22,550 tons of plates per month, respectively, the exports from the United States being about twice those from Great Britain. In 1919 and 1920, however, British exports rose to 18,250 tons per month while those from the United States were 70,300 tons per month. Even for the first quarter of 1921 the British exports were 24,700 tons and the American 76,200 tons per month; but both have declined drastically since. Never in the history of any country were

the steel plate exports so heavy as in the last 27 months from American mills, at nearly 71,000 tons per month. Nor is it likely that this record will ever again be approached. Keen competition may be expected for the world's needs in plates and serious study must be given to finding an outlet for the increased American steel plate capacity.

### The Outlook in British Steel

British steel manufacturers are staggered by the magnitude of the difficulties they now face. The coal strike has been settled, but iron and steel manufacturers cannot go ahead at the high prices they must pay for fuel. The boom of 1919 and its overhang in 1920 pushed the British steel market pounds per ton above what German, Belgian and French makers were willing to do. After the coal strike settlement British prices came off from £3 to £5 per ton, but they are still so far above those named on the Continent as to put British works out of the running as to most of the current export trade. In a recent statement issued jointly by the National Federation of Iron and Steel Manufacturers on behalf of employers and the Iron and Steel Trades Confederation for the workmen, the opinion was expressed that "in view of foreign conditions the industry will not be able to export unless fuel as well as other items of cost are reduced to a level not higher than from 75 to 100 per cent above pre-war." The statement further says that the difficulties confronting the industry "are not of its own making nor within its control; they exist largely from political causes and appear to us to require Government attention."

The London *Ironmonger*, commenting on the concluding words in the above, expresses surprise that the steel industry, "which was among the first to demand the cessation of all Government interference, should now begin to talk of Government assistance." It adds:

There have been times of great depression in the trade before now, and the industry has always pulled through by the exercise of courage and self-reliance. It may be, however, that the present depression came at a time when the makers were less prepared to meet it than on any previous occasion. There have been changes in the administrative staffs of many works during the six years of war, and the periods of control and afterward of booming prices which followed did not provide the best experience for dealing with the depression when it came. The works that best organize themselves to meet conditions surpassing the keenest pre-war competition will be the most successful in the future; and although at the moment the cost of fuel is the main factor, enterprise and enlightened guidance are bound to make their effect felt in the end.

There is no question that high fuel and labor costs will continue for a long time to be a serious handicap to British steel manufacturers in the export trade. Production of British steel will not resume on any scale until the price of coal comes down 50 per cent or more and it will be many a day before such a drastic readjustment can take place, with the control of coal production and prices so largely in the hands of the labor unions.



It seems likely, moreover, that Continental steel will be increasingly a factor in the British market. There is scarcely a quotable market, in fact, in British material, the business done being in the smallest quantities and from accumulated stock. The nearest approach to the real steel market in Great Britain to-day would be the quotation of prices now being paid there for Continental iron and steel.

It is true, as the editorial quoted above reminds the counsellors of despair, that the British steel industry has always pulled through—just as the nation has been able to pull itself together when there seemed nothing ahead but disaster. Doubtless the way will be found at length out of the dangers that now loom up so threateningly; but it must be said that the pessimists have most of the facts on their side as the case stands to-day.

### German Steel Exports

While Germany's production of pig iron and steel is not yet made public, figures as to the foreign trade in iron and steel are available, though rather old. *Stahl und Eisen* for June 30, 1921, gives details of exports and imports for the first eleven months of 1920, which indicate unmistakable recovery as far back as eight months ago. A comparison of last year's exports and imports with the pre-war movements is made in the following table:

	Exports Tons Per Month	Imports Tons Per Month
1912 .....	456,600	23,700
1913 .....	479,800	25,400
1920 (11 months) .....	142,600	32,500

German steel exports at the end of last year were at more than one-third the pre-war rate, the average for September, October and November having been 176,111 tons, or about 36.7 per cent of the 1913 figures. Of last year's exports about 40 per cent, or 57,351 tons per month, were steel bars, plates, sheets and structural steel.

Germany lost by the war nearly 40 per cent of her steelmaking capacity. In view of that loss and of the country's handicap in raw materials, the record in exports last year is not only surprising but points to very considerable exploits in the countries to the east, particularly Russia, when those outlets are opened, as they are bound to be in the next few years.

### Larger Use of Alloy Steel Castings

The character of the steel casting output of the country is changing. A comparison of the 1920 statistics with those for 1913 shows this quite clearly. While the total steel casting production last year in relation to the total steel output was practically the same as in 1913, or about 3 per cent, the ratio by processes was quite different. There was a marked decrease in the proportion of open-hearth castings and a sharp increase in the electric furnace product last year. In 1913 open-hearth steel castings were about 89 per cent of the total, but in 1920 the percentage declined to about 78. There was an increase of 5 per cent in Tropenas or side-blow converter castings last

year over 1913; but the striking gain was in electric steel castings. In 1913 electric steel castings were less than 1 per cent (0.88 per cent) of the total, but in 1920 they were 12.4 per cent, last year's output exceeding even the record of any war year, which adds to its significance.

Even more noteworthy is the showing for alloy steel castings, the use of which has developed rapidly, particularly those made in electric furnaces. It is true that in 1912 and 1913 the total of alloy castings exceeded any records before or since, but this was due mostly to the large number of locomotive engine frames made of vanadium cast steel, these being in great demand at that time. Electrically made alloy castings last year exceeded any war or pre-war record, having been 11,710 gross tons, as compared with 6057 tons in 1919 and only 926 tons in 1916 and practically none in 1913.

It is evident that in the development of the steel foundry industry, the electric process is to play a prominent part. Not only is this true of ordinary steel castings, but especially of alloy castings, which are more and more in demand as a substitute for alloy forgings. The many available alloy steels and the assurance of their almost perfect heat treatment, combined with decreased cost as compared with forgings, make this possible.

### Copper vs. Steel for Boiler Tubes

While it has been the general practice in the United States for half a century to fit steel tubes in locomotive boilers, this does not appear to have been the case in Europe. Copper boiler tubes are said to have been coming into use to a large and increasing extent in England, Australia and South America, while brass tubes on the Continent of Europe are very largely used. Exigencies of the war cut down the use of copper, but efforts are now under way to force copper to the front as the material for this purpose.

In a pamphlet issued by the Brass and Copper Tube Association of Birmingham, England, the relative advantages of the two metals from the standpoint of the British manufacturer are set forth. These advantages appear to some extent clear cut, but in others require analysis. Thus it is stated that the average life of steel boiler tubes is from 80,000 to 120,000 miles, or roughly, four years. Copper tubes, on the other hand, are credited with a life of from 240,000 to 360,000 miles or some 12 years, while as much as 480,000 miles was said to have been obtained.

With a life stated to be three times that of steel tubes, the first cost of the copper tubes is put at only about twice that of the former; and it has been estimated that during a period of 12 years the cost of a ton of copper tubes, plus interest on the investment and minus the scrap value of old tubes, would figure out at £186. This contrasts with an estimate of £293 for steel.

In making the above calculation, the first set of steel tubes is figured at £70 6s. 4d., which with interest amounts to £79 at the time the second set is installed. The investment stands at £175 at the



date of installation of the third set. The net cost is found by adding interest to this item and deducting, each four years, a set of old tubes at £10 per ton, after allowing 25 per cent for loss of weight.

Similarly, the copper tubes figured at £138 per ton amount in 12 years at 5 per cent compound interest to £247. From this is deducted the scrap value of the old tubes at £72 per ton, after allowing 15 per cent for loss of weight.

Attention is called also to possible fuel economies through using the tube of greater heat conductivity than is inherent in steel, and to the savings both in expenses and in locomotive operating time from the less frequent renewing of tubes.

## CORRESPONDENCE

### Cold Worked Steel

*To the Editor:* The interesting article in THE IRON AGE of July 21 by C. E. Bregenzer, entitled "Production and Uses of Cold Drawn Steel," should have a few words of explanation and interpretation.

The title is incorrect because a great many of the parts which are listed are cold rolled and not cold drawn. A much more appropriate heading would have been "Production and Uses of Cold Worked Steel." Strip, from which many of the parts are made, such as washers, collars, go-cart trimming, alarm clock cases, brake bands, diaphragms, etc., cannot be cold worked by any other method than rolling. Axles, arbors, shafts, shafting, special shapes, etc., are drawn. Here again the qualifying statement should appear; all axles or shafting cannot be cold drawn.

In the process of drawing the flow of the metal at the surface is faster than it is in the center, resulting in a greater tension or hardness at the surface, which may be likened to a tightly drawn skin. When a keyway is made lengthwise to the bar there is a tendency for the steel to spread at the edges of the cut, increasing the diameter of the bar at that point and throwing it sometimes considerably out of round.

In relation to shapes, the author has stated that "any shape can be drawn for which a die can be made." This, however, is not really true, as there are many shapes which it is impossible to draw because of the sharpness of the angle or the length to which it is necessary to make the metal flow in order to fill out the die. There are limitations. It would have been much better to have stated that "there are few shapes which cannot be produced by cold drawing." That would more or less limit the statement.

It is to be hoped that the article will develop discussion among manufacturers who use steel in the construction of their product, because the interests of the industry, which, according to Mr. Bregenzer's figures, amounts to approximately 3 per cent of the total finished steel products, can be very materially advanced through a better understanding of the needs of manufacturers. Manufacturers should take the steel mills into their confidence and furnish full information regarding the part to be manufactured, its function and the conditions under which it operates, so that they may take advantage of the steel companies' greater knowledge of steel, gained through constant research and experiment. Most steel companies have a very complete laboratory, which is at the service of manufacturers.

The production figures which Mr. Bregenzer gives and the distribution by major industries are certainly interesting, and are the first really authentic information which has come to my notice. Personally, we appreciate very much the efforts put forth to give cold

worked steel some little publicity and in this I am sure other makers of cold worked steel will concur.

C. E. MACCONNELL,

Advertising Manager,

Lancaster Steel Products Corporation.

Lancaster, Pa., Aug. 2.

### Proposal to License Business Men

*To the Editor:* To "start something," in the slang phrase, implies the setting in motion of an extended train of thought or action. This was probably intended to be the effect of the article recently summarized by THE IRON AGE on page 86 of the issue of July 14, and justly qualified as notable. Reading the article without knowing its authorship, the suggestion put forth, that no man should be allowed to engage in important business without passing an examination and securing a license, might be supposed to be the product of some parlor radical who believes that government can take the place of individual initiative; as if "Book-taught Bilkins" could ever be able to show the experienced mechanic how to do his work well. The writer of the article is, however, Alvan T. Simonds, the successful president of the Simonds Mfg. Co., widely known as one of the strongest American manufacturing concerns, maker of saws, knives, files and steel. Evidently, Mr. Simonds put forth his interesting suggestion with the intention of "starting something." It will be of interest to take up the train of thought, and consider whether it would be possible to insure the business world against the consequence of failures of corporations or individuals through any system of examination and licensing of those about to engage in new enterprises.

#### What Licenses Are For

It is stated in the article that licenses are required to be obtained by men about to engage in the practice of law or medicine. Licenses are also required of steam engineers, automobile operators, and many others who engage in professions or trades which may have direct effect upon the welfare, health or morals of the public. However, the examinations or investigations required prior to the granting of such licenses are not intended to determine whether the applicant will be successful in his own affairs, but only whether he possesses sufficient knowledge to avoid conspicuous errors likely to lead to accidents or danger to himself or others.

A physician earning a scanty livelihood in a small town has passed the same State requirements as the immensely wealthy specialist in the large city. One steam engineer with a first class license earns \$3 per day; another with the same grade of license may earn \$5,000 per year. The licensed man is supposed to have sufficient knowledge so that he will not prescribe poison by mistake for a helpful drug, or pump cold water into an overheated boiler. But whether the licensee will become a highly valuable member of society, or make less than a bare living for himself and family, is something which no license can ever determine.

The examination required of the lawyer on entering practice is for an entirely different purpose. It is rather to insure his knowledge of ethics and general code of practice of the legal profession, than to guard against his ignorance of points of law. Something to the same end, of maintaining a somewhat definite moral code, is obtained by the membership of the stock exchanges, operating as they do as clubs or voluntary organizations, requiring certain practices of their members, and dismissing those whose methods depart too flagrantly from the accepted code of the organization.

#### Business Success and an Educational Test

In the proposition to license men about to engage in important business, it must be that Mr. Simonds has in mind something other than the mere certification that the candidate has a good knowledge of economic laws. Records of the great commercial agencies show that over a long period of years the average of business failures is considerably under 1 per cent, and in recent years, tends to one-half of 1 per cent. Surely Mr. Simonds does not intend to imply that 99 per cent

of business men have that thorough knowledge of fundamental economic laws which he suggests should be determined by examination and licenses, nor that the greater proportion of the 1 per cent of failure is due to ignorance of economics.

It is a fair conclusion that business success comes to a large majority of men who are by no means fitted by any test of education or knowledge of principles to obtain it. The fact, cited by Mr. Simonds, that 120,000 corporations in the United States in 1917 produced no profits, shows only that 1917 was an abnormal period, which indeed we all know; and the same is true of the month of February, 1921, in which, according to Mr. Simonds, there were 1641 commercial failures, representing an indebtedness of over sixty million dollars.

#### Few Know Economical Principles

It is not possible to conceive that any considerable proportion of these failures could have been avoided by an average knowledge of the principle of economics, and an average knowledge is all that could be insured by any form of examination. Since the close of the war in 1918 it was perfectly evident to the very few men who were willing to think in international terms and study world conditions, that a huge financial crisis was impending. However, a search of the printed records of the past three years shows only two names, Richard Martens and Frank A. Vanderlip, who were conspicuous for their bold telling of the truth about the economic situation. The vast majority of recognized successful leaders of trade and industry in the United States are, on the contrary, on record repeatedly up to within twelve months of this writing, as predicting unlimited prosperity, continuance of industrial activity, vast profits, and higher and higher prices for American commodities demanded by all the world; and this in spite of the fact that all of the nations engaged in the late world war were financially exhausted, and operating their governments at enormous deficits.

#### The Ship Captain Is a Typical Leader

The secret of success in business is not in education, nor in experience, nor in any set of qualities or attainments which can be definitely analyzed and set apart. Mr. Simonds' illustration of the ship captain, entrusted with the welfare of ship, passengers and crew, gives a clew to the secret of success in leadership. Evidently the captain's success is not due to education alone; the mates have as good a knowledge of navigation as the captain, and often indeed the captain is less experienced than they. The ship captain's supremacy is due to his ability to control men, and to think and act quickly and correctly, whatever the crisis. No mere examination can determine whether a man who has studied navigation and sailed the seas for years has in him the necessary qualities for a successful captain.

All life activity is the result of individual initiative. The successful man is he who is able to create an idea, give it shape and form, and carry it out to a useful result. The qualities of success are often found in men totally ignorant of economic laws; yesterday keeping a small news stand, to-day operating a large organization; yesterday carrying a hod, to-day building and owning a block of houses.

#### Business Laws Like Rules of a Game

The laws which we have made to govern the operations of business are like the rules of a game. Rules of play are not to make the players successful, but to provide a standard of practice by which the game shall proceed to the greatest satisfaction to the players. From time to time we find that the public comfort can be promoted by changes in practices, and laws are passed to insure their adoption. In this way we have gradually forbidden the employment of children, and the continuance of unhealthful conditions of work. We have spread the cost of accidents over industries as a whole, through systems of labor insurance. We have done away with the practice of lower prices for wholesale transactions in the case of transportation lines, without disturbing it in other fields of business. But all these laws are only rules in the business game,

intended to provide equality between those more willing to observe the public interests and those interested only in furthering their own ends.

Business failures will always occur, no matter how well informed the leaders of industries may be. World-wide depressions, crop failures, and stock panics are no less "acts of God" than are floods and fires. The widest knowledge and the greatest foresight will not enable a man to succeed under every condition. The man who has a fundamental knowledge of economic laws has the advantage over him who has not, just as the man who knows the details of the technical side of his industry has the advantage of him who has no such knowledge.

It may be that at some time in the distant future, it will be possible to analyze and classify the subtle qualities which promote success in business and to teach these in our schools. At the present time, however, the civilized world appears thoroughly convinced that governmental interference with a man's right to practice his business in the best way he knows how is the most unfortunate experiment a nation can make.

STERLING H. BUNNELL,  
Bunnell, Macy & Henriques,  
Consulting Engineers.

New York.

#### Census Report on Wire Manufactures

WASHINGTON, Aug. 9.—The United States census report shows the value of the output of iron and steel wire manufactures in 1919 was \$264,778,000, an increase of 128 per cent compared with that of 1914. The output of copper wire and wire manufactures in 1919 was \$114,234,200, an increase of 166 per cent over 1914 and the output of brass wire was valued at \$16,024,500, an increase of 152 per cent.

Total production of iron and steel wire in 1919 was 2,508,890 short tons, an increase of but 3 per cent over 1914. Of this 592,430 tons were for sale as plain wire. The production of coated wire for sale as such in 1919, chiefly galvanized wire, was 392,925 tons as compared with 374,480 tons in 1914. Production of wire nails and spikes amounted to 12,429,200 kegs, a quantity decrease of 3.5 per cent as compared with 1914. Production of barbed wire totaled 341,130 tons, 75 per cent less than the output in 1914. Wire rope, cable and strand, showed an increase from 52,740 tons in 1914 to 103,010 in 1919. The output of woven wire fence and poultry netting, aggregating 312,150 tons, was 24 per cent less than the output in 1914, but the higher unit prices in 1919 resulted in materially greater values for all classes of products, the values of the respective years being \$419,795,800 and \$30,527,000.

Total production of bare copper wire in 1919 was 193,370 tons, of which 161,660 tons were sold as such, at a value of \$68,011,300. The production for sale in 1914 was 84,920 tons, valued at \$26,206,000. The total production of insulated wire and cable in 1919 was valued at \$129,623,100, but of this the major portion was reported by insulating establishments that purchased the wire.

The output of wire drawing mills in insulated wire and cable was valued at \$45,406,200, comprising 29,470 tons of paper insulated cable. The output of these products by the wire drawing mills in 1914 was 48,390 tons, valued at \$15,709,300. The output of brass wire as reported in 1919 was 50,521,000 lb., valued at \$16,024,500, a quantity increase of 28 per cent. Wire of other metals represented a production of 14,596,000 lb., valued at \$6,339,700, a quantity increase of 111 per cent. Included under "other metals" are copper-clad steel wire, monel metal, nickel silver and other nickel alloys, zinc, etc.

An engineering assembly is planned to be held in conjunction with the annual meeting of the American Engineering Council of the Federated American Engineering Societies. It is expected that the assembly will be spread over three days, starting between the middle and the latter part of January. The subject is to be discussed at the meeting of the American Engineering Council in Washington, Sept. 30.



## AUSTRIAN MARKET DEPRESSED

German Competition Less Active—French Sellers Sound Market—Increase in Magnesite Exports  
(Special Correspondence)

VIENNA, AUSTRIA, July 23.—Although German competition has displayed less activity in the Austrian market of late, the general situation shows little improvement. Interested circles ascribe the present inactivity of German exporters to the price recovery in Germany. Generally, offers by German works are 50 to 100 m. per ton higher than domestic quotations with terms of delivery averaging 6 to 8 weeks. There can be little doubt, however, that the slackening of German competition is but temporary and largely due to the fact that the Rhenish-Westphalian industry is being awarded most of the business which normally would go to Upper Silesia. With indications of an early solution of the Upper Silesian problem, renewed importations of German iron are anticipated.

### France Threatens To Be Formidable Competitor

Herr Rothballer, Director-General of the Alpine Montan Gesellschaft, stated at the government inquiry on customs duties that the country threatening to become the most formidable iron and steel competitor to Austria was France rather than Germany. France, he declared, bids fair to become the leading iron producing country in Europe with her augmented wealth in coal and iron. The steadily proceeding price cuts in the French iron market have made domestic producers feel apprehensive and repeated attempts of French works and merchants to sound the Austrian market have lately been reported. Much will, of course, depend upon the further development of the tariff.

### Market Conditions Erratic

No price reductions have appeared as yet, and works have shown no inclination to make concessions. The Alpine Montan Gesellschaft, widely connected with the manufacturing industry, has been able to dispose of its output, which is now about 50 per cent of normal, but the smaller works are finding it increasingly difficult to hold their own. In the case of bar iron for instance, they are unable to quote the price named by the Alpine works of 2900 kronen per 100 kg., as their production costs are by several hundred kronen per ton higher. Pig iron is quoted at about 2000 kr. per 100 kg., while 2300 kr. are quoted for ingots, and 2550 kr. for muck bars. Few of the foundries are working to capacity, especially the malleable iron foundries, which are operating at about 35 per cent of capacity. Nevertheless, several plants, idle for some time because of the coal shortage, have resumed operations on a limited scale. Rather erratic conditions prevail at Vienna foundries, some plants operating to capacity while others curtail production. Since April, 1921, the following prices are in force for gray iron castings:

	Kr.
Ordinary castings:	
100 to 1000 kg. ....	4 800
over 1000 kg. ....	4 500
Less intricate castings:	
2 to 100 kg. ....	6 040
100 to 1000 kg. ....	5 200
over 1000 kg. ....	4 900
Intricate castings:	
2 to 100 kg. ....	7 100
100 to 1000 kg. ....	6 100
over 1000 kg. ....	5 800

Reports from Graz elaborate upon the difficult position of the Styrian iron industry through labor trouble.

### Export Activity Halted

The period of activity in the export market has come to a halt, even the producers of special steel whose products have been much in demand abroad, have been forced to lay off men. It remains to be seen whether the renewed depreciation of the krone will have a stimulating effect. In manufacturing, stocks are accumulating as a result of the sluggish business and foundries, construction shops, etc., are beginning to feel the depression. Only the locomotive and rolling stock builders and manufacturers of electrical sup-

plies report satisfactory conditions. Despite the lull, the situation is not critical and the slight revival of export business to Czecho-Slovakia, which has adopted a more liberal attitude toward Austrian imports, is generally regarded as a hopeful sign.

The principal export market for the first quarter of 1921 was Italy with 33 per cent, followed by Czecho-Slovakia with 22 per cent, Germany, Hungary, Switzerland, Jugo-Slavia and Poland. Of the total imports Germany led with 55 per cent.

### Magnesite Exports Increase

There has been a notable development of the magnesite industry, several new mines, mostly in Styria, having been opened in 1920. It is noteworthy that while the United States headed the list of consumers of Austrian magnesite in pre-war years, Germany now leads. Germany is now taking larger quantities of roasted magnesite than before the war. Moreover, crude magnesite is now shipped abroad while practically none was exported before the war. The aggregate output in 1920 represented approximately 50 per cent of the 1913 production. Exports have been steadily increasing since and are given at 21,300 tons for the first quarter of 1921, compared with about 8300 tons for the corresponding quarter of 1913.

### Canadian Iron Production Very Low

Pig iron and steel production in Canada showed a tendency to increase in the late spring, according to the monthly report of the Dominion Bureau of Statistics. The May production of pig iron and ferroalloys was 57,035 tons, compared with 39,693 in April, an advance of 43 per cent. Basic iron output was nearly trebled, being 44,002 tons compared with 15,971 in April. Steel ingots and castings production was 52,001 tons in May compared with 27,381 in April.

"'Dragging Bottom' is the title of an article which appeared in THE IRON AGE regarding May output of iron and steel in the United States," says the Dominion Bureau bulletin, "and the words seem to express the feelings generally held both in that country and in Canada that iron and steel production can decline no further. The increase in Canadian steel production indicates that conditions are rather more hopeful in this country and it is believed that the demand for steel products will be augmented and that the output both of iron and steel in Canada will continue to advance in the coming months."

Notwithstanding the optimistic view expressed by the Dominion Bureau of Statistics, Canadian iron and steel producers say that business for the past two months has been decidedly backward and since the May report was compiled all pig iron furnaces in Ontario have ceased the production of foundry iron, although the Algoma Steel Corporation, Sault Ste. Marie, and the Steel Co. of Canada, Hamilton, are making basic iron for their own consumption as is the Dominion Steel Corporation, Sydney, N. S.

## The Iron Age and Its Readers

In addition to the steady flow of basic statistics of the iron and steel industry of the United States, presented week by week to the readers of THE IRON AGE, an occasional compilation of special interest to some large group of readers is published. An example is the list of electric steel furnaces of all types which has now become a feature of our Annual Review Number.

Last week another compilation was given, this covering the by-product coke ovens of the United States. This rapidly growing industry, with its saving of the valuable hydrocarbons formerly wasted, has now reached an output exceeding 30,000,000 tons of coke in one year. The table on page 264 (July 28) gives the location of the 12,245 by-product ovens built, together with information as to the type and capacity, as well as ownership.



# Iron and Steel Markets

## PIG IRON BUYING

### Larger Business Brings Out New Low Prices

#### In Finished Material There Is a General Maintenance of Recent Levels

The moderate improvement of the past two weeks in replenishment demand for steel continues, but few successors have appeared to the larger sized orders which lately brought out such keen competition in the Central Western and Chicago districts. Any new price concessions have been in pig iron rather than in finished material.

It is recognized that large business would develop special prices, but on the general run of small orders competitive deviations of more than \$1 to \$2 from the schedule recently made public by the Steel Corporation are not common.

The rate of steel works operation is substantially unchanged and the same alternation of activity and shutdowns that has obtained at many plants for several months is expected to continue into the fall.

Steel, like pig iron, fell off 20 per cent in July from the output in June. The ingot statistics published this week show 803,376 tons produced by 30 companies last month, indicating 950,000 tons for the whole industry, against 1,190,000 tons in June. The July rate represents about 11,500,000 tons per year, as against a rate of 30,000,000 tons per year in January and an actual output of 40,881,000 tons in 1920.

On larger buying than in many weeks, pig iron in eastern Pennsylvania shows a fresh decline of \$1 to \$2 per ton. The largest lot was 5000 tons of basic bought by an Eastern steel company at \$19 at furnace. Foundry iron also went to a new low level for the year, considerable sales being made at \$18.50, eastern Pennsylvania furnace, for No. 2 plain and \$19 for No. 2X. Lower quotations are reported also from the Buffalo district, No. 2 iron being offered considerably under \$19.

On the other hand, the Chicago district shows a firmer pig iron market after the blowing out of two merchant furnaces. Sellers who have been making concessions there have now taken a stand for \$20 at furnace. At Pittsburgh, due to the drastic curtailment of pig iron production, little iron is available, two sellers having withdrawn from the market this week.

The Lackawanna Steel Co., which in good times has been a buyer of pig iron, is now formally in the market as a seller, considerable bookings being reported for the past week.

An example of the wider variations in current

prices on desirable business is the placing of 400,000 tie plates, or about 2000 tons, by the Burlington at \$40 per net ton Chicago, the next bid being \$5 per ton higher.

Cabled information respecting the Bombay water supply pipe line letting indicates that the low bid at \$5,300,000, made by a British fabricator and including the laying, is less than one-half the amount of the American bid; but more than that the figures would seem to require the fabrication of the 80,000 net tons of riveted plate work at a delivered price quite a little under 2c. per lb.

Far Eastern railroad business continues to come to the United States, but with more or less complication as to shipping and financing. The General American Car Co. has an order for 700 steel box cars from a Chinese road. The same company is credited with the 14,200-ton rail contract placed by the Pekin & Suiyuan railroad after long negotiation, and is reported to have sublet it to the United States Steel Products Co. Japan has been a buyer of rails also, one order just placed in New York being for 2000 tons.

While German quotations are being made more frequently through the Stinnes office in New York, little or no German steel is coming into this market. Some cotton tie business is pending. Sixty-day deliveries on wire products are offered.

German and other European bids on steel for Japan are well below American prices. French sheet bars have been offered at \$34.70 delivered in Japan, or \$11 to \$12 under anything domestic mills would do.

## Pittsburgh

PITTSBURGH, Aug. 9.

Sentiment in the iron and steel trade here is somewhat mixed this week and the idea that the industry has rounded the corner from the depression of the past several months is not quite as uniformly held as was the case a week ago. Since price cutting has not entirely ceased, some of the trade take the position that it is decidedly premature to talk about having turned the corner and say that this condition hardly will be attained until prices have struck a point where there are no further concessions. Actual developments of the week, however, have been favorable rather than otherwise. It is noted, for instance, that in sheets the shading from what are regarded as regular quotations is a matter of cents rather than dollars, and that in the major products, there is better observance of 1.75c., Pittsburgh, for bars, and 1.85c., Pittsburgh, for plates and shapes, than has hitherto been the case. These products sold collectively are commonly quoted at 1.75c., and in some instances are said to have been priced as low as 1.70c. But sold individually the regular prices are the rule. Business in sheets shows definite improvement and orders going on the books of makers generally are more numerous than they have been. Wire products are an exception, as are also nuts, bolts and rivets.

The trade is encouraged by signs of a better demand from the railroads, which is manifested in a rather large inquiry for spikes and tie plates from the New York Central Railroad, and the promise of early

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 9, 1921	Aug. 2, 1921	July 12, 1921	Aug. 10, 1920
No. 2X, Philadelphia...	\$29.84	\$21.35	\$25.50	\$50.90
No. 2, Valley furnace...	19.50	19.50	20.50	46.00
No. 2, Southern, Cin'tl...	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19.00	19.00	20.00	42.00
No. 2, foundry, Chicago*	18.25	18.50	19.00	46.00
Basic, del'd, eastern Pa.	20.26	21.25	23.50	44.40
Basic, Valley furnace...	18.00	18.00	19.50	48.50
Bessemer, Pittsburgh...	21.96	21.96	22.96	48.40
Malleable, Chicago*	18.50	18.50	19.00	46.50
Malleable, Valley...	20.00	20.00	21.00	46.00
Gray forge, Pittsburgh...	21.46	21.46	21.46	44.40
L. S. charcoal, Chicago...	35.50	35.00	36.00	57.50
Ferromanganese, del'd...	70.00	70.00	70.00	200.00

Rails, Billets, etc., Per Gross Ton	Cents	Cents	Cents	Cents
Bess. rails, heavy, at mill.	\$45.00	\$45.00	\$45.00	\$55.00
O-h. rails, heavy, at mill.	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	30.00	30.00	33.00	60.00
O-h. billets, Pittsburgh...	30.00	30.00	33.00	60.00
O-h. sheet bars, P'gh...	32.00	32.00	35.00	70.00
Forging billets, base, P'gh.	35.00	35.00	38.00	85.00
O-h. billets, Phila...	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh...	42.00	42.00	43.00	75.00

Skelp, gr. steel, P'gh., lb...	1.75	1.85	2.00	3.25
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Finished Iron and Steel,	Cents	Cents	Cents	Cents
Per Lb. to Large Buyers:				
Iron bars, Philadelphia...	2.05	2.10	2.15	4.75
Iron bars, Chicago...	1.75	1.75	2.00	3.75
Steel bars, Pittsburgh...	1.75	1.75	1.90	3.25
Steel bars, New York...	2.13	2.13	2.28	4.02
Tank plates, Pittsburgh...	1.80	1.80	1.90	3.25
Tank plates, New York...	2.18	2.18	2.28	3.52
Beams, etc., Pittsburgh...	1.85	1.85	2.00	3.10
Beams, etc., New York...	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh...	2.25	2.40	2.50	5.50

\*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.  
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Aug. 9, 1921	Aug. 2, 1921	July 12, 1921	Aug. 10, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.50	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.50	9.00
Sheets, blue an'd, 9 & 10.	2.40	2.40	2.65	6.00
Wire nails, Pittsburgh...	2.75	2.75	2.75	4.25
Plain wire, P'gh...	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	\$5.25	\$5.25	\$5.75	\$9.00

Old Material, Per Gross Ton:	Cents	Cents	Cents	Cents
Carwheels, Chicago...	\$12.50	\$12.50	\$13.25	\$38.00
Carwheels, Philadelphia...	16.00	16.00	16.00	40.00
Heavy steel scrap, P'gh...	12.50	12.00	12.00	27.50
Heavy steel scrap, Phila...	11.50	11.00	11.00	23.50
Heavy steel scrap, Ch'go...	10.25	10.00	10.00	24.50
No. 1 cast, Pittsburgh...	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia...	17.00	17.00	16.00	38.00
No. 1 cast, Ch'go (net ton)	11.50	11.50	12.50	36.00
No. 1 RR. wrot, Phila...	14.00	14.00	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.75	9.25	9.25	24.50

Coke, Connellsville,	Cents	Cents	Cents	Cents
Per Net Ton at Oven:				
Furnace coke, prompt...	\$2.75	\$2.75	\$2.75	\$18.00
Foundry coke, prompt...	3.75	3.75	4.00	19.00

Metals,	Cents	Cents	Cents	Cents
Per Lb. to Large Buyers:				
Lake copper, New York...	12.00	12.00	12.75	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.62½	19.00
Zinc, St. Louis...	4.20	4.20	4.30	7.80
Zinc, New York...	4.70	4.70	4.80	8.15
Lead, St. Louis...	4.20	4.20	4.35	8.75
Lead, New York...	4.40	4.40	4.40	9.00
Tin, New York...	27.75	26.50	28.50	48.00
Antimony (Asiatic), N. Y.	4.60	4.60	4.75	7.25

### Composite Price, Aug. 9, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Aug. 2, 1921, 2.364c. July 12, 1921, 2.493c. Aug. 10, 1920, 3.974c. 10-year pre-war average, 1.684c.
These products constitute 88 per cent of the United States output of finished steel.	

releases against orders for standard rails from railroads tributary to Pittsburgh. There is very little activity in structural material, but steel fabricators are looking forward hopefully to the letting of a bridge across the Allegheny River at Sixteenth Street, which will take 5000 tons, and bids for which will be opened Aug. 29, and for an addition to the department store of Joseph Horn Co., involving about 3500 tons.

The pig iron market is showing a stronger undertone in all grades, but especially in foundry and Bessemer, production of which has been extremely light so far this year; consumptive requirements though small have been so persistent as to have resulted in a practical exhaustion of supplies. Furnaces supplying this market have almost no iron of the latter grades left and the appearance of sizeable orders might well send up prices.

We note no material change in steel plant operations in this and nearby districts as compared with a week ago, but some of the idle capacity recently started up is likely to go down again unless there is more business shortly.

**Pig Iron.**—The interesting feature of the situation this week is not in sales or prices but rather in the sold up condition of the merchant producers of foundry and Bessemer grades. Of the four furnace interests which have had foundry iron for sale, two have definitely withdrawn from the market in the past week, and the others have only a very limited tonnage available for the market. Since it is highly improbable that any of the idle merchant furnaces will be relighted on the present basis of costs and selling prices, the indications point to some stiffening of the market before long. One maker, who has some iron, will not consider less than \$20 for No. 2 grade. Available stocks in Cleveland are said to be fairly heavy, but to bring iron here from

that district would mean a heavy freight charge and naturally would enhance the value of iron produced in the Valley or in western Pennsylvania at least to the extent of the difference in the freight rate. Some of the steel companies undoubtedly could make foundry iron, but there is considerable question that they will do so. A demand of any considerable size for Bessemer iron also would strengthen prices, because so little of this grade is available. There seems to be no shortage of basic iron, but because of high producing costs there is a disposition to ask a little more money than was acceptable recently. Two inquiries involving about 1000 tons of basic iron are before the market. The prospective buyers expect to place the business at less than \$19.96, delivered, which would be the price on Valley iron at \$18, furnace. The Standard Sanitary Mfg. Co. is reported to have bought a tonnage of foundry grade for its Louisville, Ky., plant, the tonnage being distributed between Alabama and southern Ohio furnaces. The A. M. Byers Co. has under consideration the relighting of its furnace at Girard, Ohio.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$18.00
Bessemer	20.00
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.00

**Ferroalloys.**—There has been no increase in business and the desire for orders keeps prices on the down grade. We note one sale of 100 tons of 78 to 82 per cent domestic ferromanganese to a West Virginia steel maker at \$70 delivered. English ferromanganese now is being offered at \$65 Atlantic seaboard, for spot delivery, equivalent to \$70.32 delivery, Pittsburgh. The sale of a carload of 50 per cent ferrosilicon to a Valley steel company is noted at \$60, furnace, freight al-



lowed. Makers of spiegeleisen have revised their asking prices, quoting average 20 per cent material at \$27 furnace and 16 to 19 per cent manganese content at \$25. Sales of the latter material are very few in this district and little inquiry is noted. Recent reductions in prices of Bessemer ferrosilicon and silveries have not stimulated the demand.

We quote 78 to 82 per cent domestic ferromanganese at \$70 delivered; 76 to 80 per cent \$68; 76 to 80 per cent British ferromanganese \$65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at \$27 furnace; 16 to 19 per cent \$25; 50 per cent ferrosilicon, domestic, \$60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent \$36.50; 11 per cent \$39.80; 12 per cent \$43.10; 13 per cent \$47.10; 14 per cent \$52.10; silvery iron, 6 per cent \$25; 7 per cent \$26; 8 per cent \$27.50; 9 per cent \$29.50; 10 per cent \$31.50; 11 per cent \$34; 12 per cent \$36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

**Billets, Sheet Bars and Slabs.**—No important inquiries in these forms of semi-finished steel are before makers in this district, because demands for finished products, to a large extent, are being met from existing stocks and non-integrated manufacturers, owing to the instability of prices in finished lines, seem to believe they will be able to buy billets, slabs and sheet bars at less than to-day's prices. Quotations are nominal and untested.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$30; 2 x 2-in. billets, \$32; Bessemer and open-hearth sheet bars, \$32; slabs \$31; forging billets, ordinary carbons, \$35, a'l f.o.b. Youngstown or Pittsburgh mills.

**Wire Rods.**—Prices are not at all well defined, because business is so limited. Makers here continue to quote \$42, Pittsburgh, for No. 5 common soft rods, but it is believed they would consider at least \$2 per ton less on orders which would provide a mill schedule. On export inquiries considerably less than domestic base has been quoted. Prices are given on page 370.

**Structural Material.**—Reports by fabricating interests here vary somewhat. Some still report inquiry to be lifeless while others note a definite increase. Awards still are of small tonnages. The McClintic-Marshall Co. has taken a bridge across the Wyandotte River at Mann W. Va., and a building for the Detroit Motor Co. at Washington, Pa., each project requiring 100 tons and a building for the Acme Chair Co., Reading, Mich., for which about 75 tons will be needed. There is considerable irregularity in plain material prices, but fabricating interests who have tested the market have not found producers in this district willing to go much below 1.85c. on plates and shapes. Prices are given on page 370.

**Plates.**—An inquiry involving more than 6000 tons is reported, but other details are withheld. Generally the demand is for small lots and not much mill capacity is engaged here. Railroads tributary to Pittsburgh are not doing much car repair work and the companies in this district which would benefit most by such orders are running at a very low rate. On the small inquiries coming out here there is not much disposition to quote less than 1.85c., but this price is being shaded on sizable inquiries.

We quote sheared plates, 1/4 in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

**Steel Skelp.**—Prices still are on the down grade because of light demands and the desire of makers for business. As low as 1.75c., Pittsburgh, recently has been quoted and the highest asking price of any of the producers now is 1.90c.

**Iron and Steel Bars.**—Although there have been quotations of well below 1.75c. on steel bars when quoted in conjunction with plates and shapes, there is no important deviation from this price against individual inquiries for bars. Demand in this district is entirely for small lots for prompt shipment. The market also is dull on reinforcing bars and shows no life in iron bars.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c. in carloads, f.o.b. mill, Pittsburgh.

**Sheets.**—Sentimentally, at least, this market is better, although price cutting still is noted. Shipments by the leading interest last week were the best of any week this year, and it also has received, in the past few days, quite a number of releases against suspended

orders. Independent companies also seem to be faring better in the matter of orders and shipping instructions, and while general business still leaves much to be desired, the belief gains ground that this branch of the industry is rounding the corner from the extreme dullness of the recent past. Some makers are quoting black sheets at 3.25c. base, galvanized at 4.25c. base, and blue annealed at 2.50c. base. These prices, however, find little or no basis in sales, the more common quotations being 3c., 4c. and 2.40c., respectively. Even the latter prices are being shaded but there is some encouragement in the fact that the concessions are a matter of only 50c. to \$1 per ton as against \$5 a ton, or more, from regular quotations a short while ago. Prices are given on page 370.

**Tin Plate.**—The market continues a very limited affair, especially in regard to tin plate for perishable food containers, which, with oil containers, ordinarily account for more than 60 per cent of the country's total production. Orders for production plate readily are placed at \$5.25 per base box, Pittsburgh, and it is probable that a really desirable order could be placed for less. Stock tin plate is available at \$4.75 per base box, and in view of the fact that current production is in excess of orders and specifications, there is a suspicion that the material moving as stock plate is being "sweetened" with standard stock.

**Nuts, Bolts and Rivets.**—The market still is dull, unsettled and weak. Conditions are so bad that most makers in this district are shutting down rather than pile up stock at current costs. Present prices show heavy losses, it is claimed, but makers are meeting competition, especially where regular customers are concerned. Prices and discounts are given on page 370.

**Iron and Steel Pipe.**—Demand for both steel and wrought iron pipe slowly but steadily is increasing, but orders in all cases represent actual needs, and as yet there is no disposition on the part of jobbers to build up stocks. Plant operations show no appreciable increase, although the A. M. Byers Co. this week started up 22 puddling furnaces and a muck bar mill at its Girard, Ohio, plant. Operations of steel pipe furnaces do not average 30 per cent of capacity and are not even that high with the leading interest. Prices on line pipe are not very closely observed, but in other directions the July 7 card is well adhered to, and reports, which have been current in the past week, that the National Tube Co. is about to announce a reduction in prices, are vigorously denied. Discounts are given on page 370.

**Wire Products.**—Recent improvement in business has not been maintained, all makers in this district reporting the past week as having been an extremely quiet one. Jobbers are moving a good many nails, but are extremely cautious in the matter of replacement, chiefly because of suggestions that present prices will not hold. Prices of nails, and for that matter wire products generally, are being better maintained than most of the steel products and the basis for talk of lower prices is not easily discerned. The only plausible reason advanced is that business is far short of what it should be at this time of the year, and competition for a share of the passing orders is rather keen.

We quote wire nails at \$2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.50 base per 100 lb., Pittsburgh.

**Cold Finished Steel Bars.**—Prices still show a wide variation on actual business. The so-called official quotation is 2.60c. base, Pittsburgh, and while some business is being done at this figure, it may be said to be non-competitive. Where buyers scatter their inquiries, concessions of \$2 to \$4 per ton are known to have developed.

**Steel Rails.**—Light rails rolled from new billets are no longer quotable at higher than 1.85c., Pittsburgh, because demand is light and competition for orders is sharp. Rerolled old sections have been quoted as low as \$32 per net ton, mill, which if applied to a Pittsburgh base, would be equivalent to about 1.50c. This price, however, refers to the lighter sections and 40-lb. rails, for which the demand is best, are not being of-



fered at all freely by mills which reroll old standard rails. Specifications against orders for standard rails still are reported to be light.

We quote 25 to 45-lb. sections, rolled from new steel, 1.80c.; rolled from old rails, 1.60c. to 1.75c.; standard rails, \$45 mill for Bessemer and \$47 for open-hearth sections.

**Spikes.**—Inquiries for track fastenings are more numerous and include a large one for spikes and tie plates from the New York Central Railroad as well as smaller ones for spikes from the Erie Railroad and the Norfolk & Western Railroad. Inquiries for spikes are looked upon as real ones in view of the fact that railroads tributary to this center are planning to release considerable tonnages of rails before the month is out. Standard spikes are quoted at \$2.75, base, per 100 lb. by all makers. The leading interest still is quoting angle bars at \$3.25, Pittsburgh, and is not shading this figure on the ground that to do so would not produce business, as the order for all of the bars required accompanied the rail orders placed early in the year. Prices are given on page 370.

**Coke and Coal.**—The market for furnace coke seems to have entirely disappeared. Such blast furnaces as are active that are supplied from the Connellsville district are covered by contract and the great bulk of current demands is for tonnages for other than blast furnace use. The more common asking price for standard 48-hr. coke is \$3, but supplies still are available as low as \$2.75. There is a good steady business in foundry coke, with prices ranging anywhere from \$3.75 to \$4.50, per net ton oven, most of the business being right around \$4.25. The coal market shows considerable strength in the slack grade, which is scarce on account of the fact that due to the light movement to the Lakes little coal is being screened. Steam slack readily commands \$1.75 per net ton at mines, and gas slack \$1.85. Mine run grade of steam coal is quotable at \$1.50 to \$2, by-product \$1.50 to \$1.75, and gas coal \$2.25 to \$2.50.

**Old Material.**—The slightly firmer tone recently noticed in the market has crystallized into actual advances in several of the steel works grades. Increased open hearth furnace operations have resulted in some buying by the steel companies, and this has tended to emphasize the shortage of material available for quick shipment. The railroads lately have shown a tendency to hold scrap rather than let go of it at the prices offered, and dealers who have good-sized yard stocks are not inclined to draw from them at current quotations. Up to \$13 now is being paid by both dealers and melters for heavy melting steel in this district, and a recent sale in the Youngstown district of 300 tons carried a price of \$13.50. Compressed sheets are valued at least 50c. per ton higher than they were a week ago, and it is noted that bids of dealers of close to \$15 per gross ton delivered, failed to secure any of the rerolling rails recently offered by the Pennsylvania Railroad, eastern region. The Baltimore & Ohio Railroad will open bids Aug. 15 for 22 cars and 13,670 gross tons of old material, also for 3000 lb. high speed steel and 15,000 lb. wire cable.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$12.50 to \$13.00
No. 1 cast cupola size.....	15.50 to 16.00
Rerolling rail's, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.50 to 15.00
Compressed sheet steel.....	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist..	8.00 to 8.50
Railroad knuckles and couplers.....	13.00 to 13.50
Railroad coil and leaf springs.....	13.00 to 13.50
Railroad grate bars.....	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker.....	16.00 to 16.50
Railroad malleable.....	12.00 to 12.50
Iron car axles.....	18.00 to 19.00
Locomotive axles, steel.....	17.50 to 18.00
Steel car axles.....	14.00 to 14.50
Cast Iron Axles.....	13.50 to 14.00
Rolled steel wheels.....	13.00 to 13.50
Machine shop turnings.....	7.25 to 7.50
Sheet bar crop ends at origin.....	11.50 to 12.00
Heavy steel axle turnings.....	8.50 to 9.00
Heavy shoveling turnings.....	8.00 to 8.50
Heavy breakable cast.....	13.50 to 14.00
Steel plate.....	11.50 to 12.00
Cast iron borings.....	7.50 to 8.00
No. 1 railroad wrought.....	12.00 to 12.50

**Hoops and Bands.**—Makers quite generally are quoting 2.40c. base on both products but it is frankly admitted that very little business is being done at this figure, and on hoops there are reports that sales recently have been made by some makers at 2.25c. and even as low as 2.15c. Desire for business is strong in some quarters, but in others there is a feeling that a cutting of the so-called regular quotation is likely to discourage rather than encourage purchases.

**Hot-rolled and Cold-rolled Strips.**—The tendency of the demand is toward improvement, but this is accompanied by a good deal of eagerness on the part of some mills for orders and prices favor buyers. Cold-rolled strips hardly are quotable longer at more than 4c. base and while some mills are disinclined to go below 2.60c. base on hot-rolled strips, on the basis of current costs, others will not let business slip out of their hands at 2.40c. Reports that hoops have sold as low as 2.15c. base are not without effect upon the price ideas of buyers.

## British Iron and Steel Market

### Some Improvement in Tone—More Blast Furnaces and Tin Mills Now in Operation

(By Cable)

LONDON, ENGLAND, Aug. 9.

Seven Cleveland blast furnaces are now in operation, but no further blowing-in of furnaces is anticipated until cheaper fuel becomes obtainable. Cleveland stocks of foundry iron are low. Inferior grades are plentiful but unsalable. Pig iron prices are tending upward, though sales continue of Continental foundry iron at £5 (\$18.30) c.i.f. Scotland and basic iron at £4 5s. (\$15.56) delivered Tees. French pig iron is quoted at £4 (\$14.64) to £4 10s. (\$16.47) f.o.b.

There is some slight improvement in general steel business for export, but the volume of orders is insufficient to enable the works to start up again. Home trade buying is in abeyance, very few orders being secured by British works. Prices remain unaltered, but cuts are imminent, owing to keen Continental competition. French billets are quoted at £6 (\$21.96) to £6 10s. (\$23.79) f.o.b.; German merchant steel bars at £8 (1.31c. per lb.) to £8 2½s. (1.33c. per lb.) f.o.b. German merchant bars sold last week at £8 10s. (1.39c. per lb.) c.i.f. Madras and £7 15s. (1.27c. per lb.) f.o.b., with delivery in 8 to 12 weeks. German plates are now quoted at £8 2½s. (1.33c. per lb.) to £8 5s. (1.35c. per lb.) f.o.b. Belgium is out of the running, and most works are closed, because of scarcity of water, this factor being much more serious than last week.

Further Welsh tin plate mills are now operating, the percentage now being 25, and the usual August holiday week having been abandoned. Stock tin plates have been reduced 2s. (\$0.37) basis f.o.b. A fair line of oil plates has been placed at 25½s. (\$4.67) f.o.b. There is good demand for wasters, and light weight specifications are scarce.

Norsk Valswerke of Norway has completed the first rolling of Norwegian tin plates and has orders booked ahead for several months for Norwegian packers. It is estimated that the annual output of the works will be 10,000 tons.

India has bought fair lines of galvanized sheets under £22 (3.59c. per lb.) basis f.o.b., and some 24-gage corrugated at £21 15s. (3.55c. per lb.) f.o.b., but general inquiry is slack. Germany is quoting £18 15s. (3.06c. per lb.) c.i.f. for Japanese specifications of black sheets, an advance from the price of £18 5s. (2.98c. per lb.) c.i.f., at which Germany sold black sheets to Japan

(Continued on page 373)

## Chicago

CHICAGO, Aug. 9.

Sentiment has improved, notably in the pig iron and scrap markets, and there is a tendency among sellers to take a firmer attitude in quoting prices. With the blowing out of a blast furnace at Maysville and another at the Iroquois plant, only one stack, an Inland Steel Co. furnace, is still producing merchant iron in this district. The latter company has advanced its prices to a minimum of \$20, furnace, and has announced that it will blow out the furnace rather than accept further business at prices which are far below costs.

There are also some indications of firmness among sellers of finished steel, but not enough to stabilize prices. Current business is going at a variety of prices, depending on the severity of competition and the attractiveness of the order, and sellers themselves admit that there are no ruling quotations. Reports of the abandonment of the Pittsburgh basing point in quoting finished steel are no doubt accounted for by the fact that in some instances delivered prices have figured back to approximately 1.85c. for plates and shapes minus the freight charge from Pittsburgh to Chicago. These exceptionally low prices are not regarded as demonstrating the abandonment of the Pittsburgh basing point but rather as an indication of the extreme limits to which sellers have gone to secure desirable tonnage. After all, the buyer is interested only in the delivered price, and it is immaterial whether he figures it back to Pittsburgh or Chicago.

The wide range of prices at which business is being booked is indicated by the fact that an open letting of structural material by a railroad last week did not bring out a lower figure than 1.85c., Pittsburgh. On the other hand, some orders have been booked at less than 1.75c., Pittsburgh, which is the minimum quotation on plain material published under the structural material paragraph below. The same uncertainty as to prices applies to plates and mild steel bars and to a less extent to sheets. A number of mills are refusing to deviate from the so-called official prices announced a fortnight ago, and in view of losses incurred meeting the sharp competition now prevalent, it would not be surprising if other producers would follow their example. A letting of 400,000 tie plates by the Burlington Railroad last week brought out a quotation of \$40 per net ton, Chicago, by a local mill, or \$5 a ton under the previously ruling price. Cast iron pipe has been moving at low prices and some observers believe that with the placing of several hundred tons at \$31.85, Birmingham, the bottom was reached. Domestic railroads continue to concentrate their attention on the repair of rolling stock. An order for 700 new steel box cars, however, has been received by the General American Car Co. from a Chinese road. This company has also booked 14,200 tons of rails for the Pekin & Suiyuan Railroad, which have been sublet to the United States Steel Products Co.

Mill operations are at about the same rate as heretofore, the Illinois Steel Co. being on a 30 per cent basis and the Inland Steel Co. on a 25 per cent basis.

**Pig Iron.**—The blowing out of the last two active furnaces represented by the leading merchant has left only one producing stack in this district, an Inland furnace. A coincident development was the announcement by the Inland Steel Co. that it would take no further business at less than \$20, base, furnace. The leading merchant interest has also advanced its prices to that level. The sharp competition which has prevailed in this market for months has forced prices down step by step, until they have reached a point where every order was taken at a larger loss. Producers have decided that idleness is preferable to a continuation of this condition. The advance in prices has resulted in closing considerable business which was pending. Two 1000-ton lots of foundry iron were sold in Cincinnati territory at \$18.50, Chicago, while 1000 tons and 200 tons were closed in this district at \$18.25, Chicago. The St. Paul Railroad and the Benton Harbor Malleable Foundry Co., which were both in the market for 1000 tons of malleable iron, have bought at least part of the tonnage asked for. While it is true

that considerable business was brought to a head by the advance in prices, a genuine increase in orders and inquiries is to be noted. A railroad equipment manufacturer is in the market for 2000 tons of malleable and intimated that as much as 3500 tons may be bought. Orders for 200, 300 and 400 tons are more numerous. That foundry operations are slowly but steadily increasing in this district is indicated by the fact that shipments of coke to melters by the leading interest have doubled within the last ten days. Coke is a better gage of operation than pig iron, because stocks of the former in foundry yards are not large. While it is true that pig iron stocks of some melters are still ample for several months' operation, many foundries which believed their supplies sufficient to carry them through this year are now finding it necessary to enter the market. No sales have yet been reported at the new prices and for that reason they are not yet quoted below. That there are elements of strength in the pig iron market is not denied even by buyers. The leading merchant reports that sales of pig iron thus far this month are at twice the rate of bookings in July. Another seller took orders aggregating 4000 tons within the course of a few days. Stocks on furnace yards are not heavy. The leading seller has about a month's full production on hand, but half of this tonnage is covered by old commitments. Charcoal pig iron is now available at \$30, furnace. One hundred tons of 7 per cent silvery has been bought at \$30, delivered Milwaukee.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.	
1.50, delivered at Chicago.....	\$33.50
Northern coke, No. 1, sil. 2.15 to 2.75.	18.50 to 19.50
Northern coke foundry, No. 2, sil.	
1.75 to 2.25.....	18.25 to 19.25
Northern high phos. ....	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25....	26.67
Malleable, not over 2.25 sil.....	18.50 to 19.00
Basic .....	18.50 to 19.00
Low phos., Valley furnace, sil. 1. to 2	
per cent, copper free.....	30.00
Silvery, sil. 8 per cent.....	31.82

**Ferroalloys.**—From 600 to 1000 tons of ferromanganese has been bought within the past week, the principal purchasers being the Griffin Wheel Co. and the American Steel Foundries. The prices paid by these two companies were \$71 and \$68 respectively, freight allowed. A carload of 50 per cent ferrosilicon has been bought by an Indiana Harbor foundry at \$62.50, delivered.

We quote 78 to 82 per cent ferromanganese, \$68 to \$71 delivered; 50 per cent ferrosilicon, \$62.50 to \$65 delivered; spiegeleisen, 18 to 22 per cent, \$35.07 delivered.

**Railroad Equipment.**—The Chicago Great Western has let repairs on 250 box cars to the Ryan Car Co. The steel involved is negligible. The Illinois Central is asking for figures on the repair of 1250 gondola cars. The St. Paul is repairing 1000 cars in its Milwaukee shops.

**Plates.**—The price situation is substantially the same as a week ago. Some mills continue to quote 1.85c., Pittsburgh, on tank plates and have booked small tonnages at that price. Other producers are meeting competition, frequently naming 1.75c., Pittsburgh, and sometimes even lower. Reports persist that the business is being taken at 1.85c., Chicago, thus eliminating the much assailed Pittsburgh base, but verification is lacking. While it is true that the market lacks stability, it cannot be said that it has grown weaker since a week ago. On the contrary, a number of makers are taking a firmer attitude in the belief that there is danger of prices being stampeded to levels which would prove ruinous. There is little tonnage in sight, but some mills note a slight increase in the number of small orders. Out of the car repair orders let by the New York Central to Western car builders 1500 steel open top cars to be renovated at Detroit and Madison, Ill., plants of the American Steel Car & Foundry Co. will involve considerable steel, as yet not accurately estimated, which will probably be furnished by a local mill. The box car repairs let to Western car builders



by the same road will call for little steel and in each case the railway will attempt to supply the material from its own stocks before purchases may be made on the open market.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

**Structural Material.**—Plain material in attractive tonnages is available at 1.75c., Pittsburgh, but some small lots continue to be booked at 1.85c. Structural business is diminishing in volume. Large projects which could not be gotten under roof before winter are not being undertaken, but small jobs are still numerous. Locally building has been held back by the failure of the arbitrator in the dispute between the contractors and unions to bring about an agreement. Pending a settlement, the old wages for the various crafts remain in effect. On Aug. 11 bids will be taken on the fabrication of 1700 tons for the commercial and technical high school, Omaha. This project will also involve 1000 tons of reinforcing bars. Recent fabricating awards include:

First Baptist Church and office building, Houston, Tex., 1100 tons, to Phoenix Bridge Co., Phoenixville, Pa.

Gallup-American Coal Co., Main tippie and miscellaneous steel for platforms, Gallup, N. M., 270 tons to Kansas City Structural Steel Co.

Illinois State Highway Department, bridges, 200 tons to Decatur Bridge Co.

Arcade Building, Laramie, Wyo., 142 tons to Dunbar Co., Salt Lake City.

Steel viaduct, Lawye Street, Appleton, Wis., Wausau Iron Works, Wausau, Wis., low bidder at \$59,800.

#### Pending business includes:

Addition to Bamberger department store, Newark, N. J., 1300 tons, George A. Fuller Co., New York, general contractor; Jarvis Hunt, Chicago, architect.

Federal Reserve Bank, St. Louis, plans not completed.

The mill quotation is 1.70c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

**Bolts, Nuts and Rivets.**—A slow but gradual improvement in business is noted, but prices still lack firmness. The railroads are putting out some attractive inquiries for bolts, nuts and rivets, and, although it is obvious that they are buying only for immediate needs, their requirements are considerably larger than for several months previous. Jobbers continue to buy sparingly. While prices are irregular, the following discounts are rather commonly quoted and on railroad inquiries of size even better has been done:

Large structural rivets.....	\$2.40
Large boiler rivets.....	2.50
Small rivets.....	70, 10 and 10 per cent off list
Large machine bolts.....	75 and 10 per cent off list
Small machine bolts.....	65 and 10 per cent off list
Small carriage bolts, rolled threads	70 and 5 per cent off list
Carriage bolts, cut threads, all sizes	65 and 10 per cent off list
Lag bolts.....	70 and 5 per cent off list
Hot pressed nuts, blank.....	\$5.25 off list
Hot pressed nuts, tapped.....	\$5.00 off list
Cold punched nuts, blank.....	\$5.10 off list
Cold punched nuts, tapped.....	\$4.75 off list
Stove bolts, in packages.....	80, 10 and 10 per cent off list
Stove bolts in bulk.....	80, 10, 10 and 2½ per cent off list

An interesting recent development is the fact that some makers are now quoting net prices instead of list as discount.

**Bars.**—The market on mild steel bars ranges from 1.65c. to 1.75c., Pittsburgh, and even lower quotations are occasionally reported. There continues to be a fair run of construction projects calling for reinforcing bars, the largest being on an Omaha high school, involving 1000 tons. There are some encouraging aspects to the bar iron situation, but bookings are not yet large enough to permit uninterrupted mill operation. It is notable, however, that orders, if not large, are more numerous. An Indiana mill booked more orders for bar iron in July than in any month in its history, but the aggregate tonnage was light. Railroads continue to buy cautiously, but individual orders from them are larger, not infrequently running up to 400 and 500 tons. Bar iron is commonly quoted at 1.75c., Chicago, but there has been some shading under that price. Demand for rail carbon steel bars is still sub-normal and mill operations are intermittent. Some business has

been taken at 1.75c., mill, and the ruling market appears to lie between that price and 1.85c., mill.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c. to 1.85c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

**Sheets.**—The price situation has not changed materially since a week ago. Demand is spasmodic, resulting in fluctuating mill operations. During the current week the local independent is running 14 out of 18 hot mills.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

**Cast-Iron Pipe.**—Recent lettings have brought out low figures, but with the placing of an attractive tonnage at \$31.85, Birmingham, many believe rock bottom has been reached, and some are of the opinion that prices are now firmer to the extent of \$2 or \$3. Manitowoc, Wis., bought a carload at \$35, Birmingham, while Milwaukee let 275 tons to the National Cast Iron Pipe Co. at \$34.50, Birmingham. Hammond, Ind., took bids yesterday on 3700 tons of 36-in., and Bay City, Mich., took bids on 3000 tons on the same date. The National Cast Iron Pipe Co. has taken the following business: 800 tons from Saginaw, Mich.; 200 tons from Minneapolis; 125 tons from St. Paul; and 100 tons from Detroit.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$45.60 to \$48.60; 6-in. and above, \$42.60 to \$45.60; class A and gas pipe, \$3 extra.

**Old Material.**—Users and sellers are finding it difficult to meet on common ground. Some dealers are buying railroad material at advanced quotations and are holding their stocks in anticipation of a rise in the market. This speculative activity has pulled up the prices which consumers have paid within the past week, but some dealers refuse to sell at the quotations which users are willing to pay. Buying by users is light and the market appears to be passing entirely into the hands of the sellers. Railroad lists include: Baltimore & Ohio, 10,000 tons; Great Northern, 2500 tons; Pere Marquette, 2000 tons; Chicago & Eastern Illinois, 1000 tons; Pullman Co., 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails.....	\$15.00 to \$15.50
Relaying rails.....	27.50 to 30.00
Car wheels.....	12.50 to 13.00
Steel rails, rerolling.....	12.25 to 12.75
Steel rails, less than 3 ft.....	11.50 to 12.00
Heavy melting steel.....	10.25 to 10.75
Frogs switches and guards cut apart	10.00 to 10.50
Shoveling steel.....	9.75 to 10.25
Low phos. heavy melting steel.....	13.50 to 14.00
Drop forge flashings.....	6.00 to 6.50
Hydraulic compressed sheet.....	6.50 to 7.00
Axle turnings.....	7.50 to 8.00

Per Net Ton	
Iron angles and splice bars.....	13.50 to 14.00
Steel angle bars.....	10.00 to 10.50
Iron arch bars and transoms.....	13.50 to 14.00
Iron car axles.....	17.50 to 18.00
Steel car axles.....	12.50 to 13.00
No. 1 busheling.....	8.50 to 9.00
No. 2 busheling.....	5.75 to 6.25
Cut forge.....	9.00 to 9.50
Pipes and flues.....	6.50 to 7.00
No. 1 railroad wrought.....	9.75 to 10.25
No. 2 railroad wrought.....	9.50 to 9.75
Steel knuckles and couplers.....	10.75 to 11.25
Coil springs.....	12.75 to 13.25
No. 1 machinery cast.....	12.00 to 12.50
Low phos. punchings.....	11.00 to 11.50
Locomotive tires, smooth.....	10.25 to 10.75
Machine shop turnings.....	3.00 to 3.50
Cast borings.....	4.50 to 5.00
Stove plate.....	11.00 to 11.50
Grate bars.....	10.00 to 10.50
Brake shoes.....	10.00 to 10.50
Railroad malleable.....	12.00 to 12.50
Agricultural malleable.....	12.00 to 12.50
Country mixed.....	8.00 to 8.50

**Wire Products.**—There is a good demand for wire nails from jobbers and inquiry for barb wire is picking up. Sales to jobbers by the leading interest are now about 80 per cent of normal for this time of the year. Purchases are still small but are increasing in number, indicating that jobbers are turning their stocks fast. The harvesting of crops in Nebraska and Iowa has had



a favorable effect on business from those sections. The railroads are buying nails, barb wire and fencing more freely and an inquiry for two carloads of nails has been received from a carbuilder. The Great Northern recently bought 700 kegs of nails. Prominent among current inquiries is one from a local jobber for 1800 kegs of nails. Prices are holding. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 370.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.38 per 100 lb.; No. 9 and heavier bright basic wire, \$3.53 per 100 lb.; common wire nails, \$3.48 per 100 lb.; cement coated nails, \$2.90 per keg.

**Rails and Track Supplies.**—In a public letting the Chicago, Burlington & Quincy awarded 400,000 tie plates to a local mill at \$40, per net ton, Chicago. This price was \$5 under the next bid. Track spikes and bolts have declined, the former being available at 2.50c. to 2.75c., Pittsburgh, and the latter at 3.50c. to 3.75c., Pittsburgh.

Standard Bessemer rails, \$45; open-hearth rails, \$47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

## Buffalo

BUFFALO, Aug. 9.

**Pig Iron.**—The Lackawanna Steel Co. has definitely entered the pig iron market as a seller, a campaign to sell surplus iron in progress for the last two months having brought about a decision to become an active factor. A considerable quantity of iron has been sold in the past week, but figures as to the tonnage booked are not available. The price is understood to have been \$19 and \$19.50 for the base grade, according to the size of the order. Generally feeling is better and improvement in inquiry is noticeable. A national user who is in the market every thirty days and consumes about 1000 tons in the same period is known to have bought about 700 tons here. One interest which reported a slow movement in July finds improvement both in inquiry and sales. Their orders last week were slightly under 1000 tons at \$20.50 base. Inquiry is for 5000 tons, a decided increase. A furnace now making basic iron for its own use in another department plans a month's run and conditions at the end of the period will determine the future. The policy of one furnace not to take orders for greater than 60 days' delivery has been of necessity abandoned and business is now accepted only for 30 days' delivery.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$20.75 to \$21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

**Finished Iron and Steel.**—The consensus of opinion with the majority of interests, based on a more diversified inquiry and some slight increase in orders, is that the market is firmer and more stabilized. While no one is ready to say business is good, the general expression is that improvement is real and tangible. Pipe products show a better movement than plates or shapes, and orders in galvanized sheets show improvement. Orders are mostly for carload lots except in plumbing and steamfitting pipe. Generally the buyers are well satisfied with present prices, and there is only remote expectation that further reductions will come. The lowest price on bars is 1.75c., Pittsburgh. Some desirable inquiries in black sheets for 100 tons and greater quantities engage one office and the general prospect of sheet business is better. Bolts and nuts are quiet. An order for reinforcing bars for the Detroit-Belle Isle bridge has been placed with a local maker and the price is said to be 1.75c. Not all the tonnage has been awarded on this job; less than 1000 tons is involved in that portion placed with the Buffalo mill. The same interest has taken an order for 2500 tons of rails for export. Labor troubles still exist as factors in holding up structural jobs, which include desirable tonnages both of bars and shapes. An order for 800 tons of billets has been booked by one interest.

One sheet maker is now operating on a 50 per cent basis. Reinforcing bars for two Rochester schools have been placed here.

**Warehouse Business.**—Sheet prices have been reduced again and a consequent better movement is noticed, particularly in galvanized products. Inquiry has picked up in a very appreciable way and more orders have been filed by one warehouse interest in a week than before this year. The improvement in tonnage per order is small, but the number of orders is greater. Prices now being quoted are generally admitted to be satisfactory and the tendency to buy is more marked than at any time since the depression set in.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

**Old Material.**—To indicate the lifeless condition of this market one dealer, in normal times perhaps the busiest, has not bought or sold a ton of material. The slight blast furnace and open hearth operation which developed Aug. 1 has not helped the market. The mill interests which have improved their operating schedule find themselves with old contracts unfulfilled, and whatever little material is being shipped applies on these old orders. Governmental decision withdrawing some of the steel offered at Hog Island and other places was a disappointment to one dealer who bid on the various lots.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$10.00 to \$11.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Rundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

## New York

NEW YORK, Aug. 9.

**Pig Iron.**—Strenuous competition has again forced prices lower. About 8000 tons of iron has been inquired for in this district in the past week and about half that amount has been sold. A sale of eastern Pennsylvania iron, both 2 plain and 2X, is reported as having been made at \$18.75, furnace, no price distinction being made in the two grades. Another offer on the part of an eastern Pennsylvania furnace was at \$18.50, furnace, for 1.75 to 2.25 silicon. An even lower offering of Buffalo iron is reported, the price being \$18 at furnace for 2.25 to 2.75 silicon. Sellers who have cut what they believed to be the market price in quoting on an inquiry are surprised later to find that the business has gone elsewhere at a still lower price. The factor of sagging prices is counterbalanced by the greater number of inquiries, which indicate that there is a fairly healthy demand and that some buyers' stocks have been used up. Inquiries are beginning to be made for last quarter delivery, as instanced by the one from a Brooklyn foundry for 100 tons each month over the balance of the year. Another for last quarter calls for 400 tons.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$22.52 to \$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.52 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.02 to 22.02
Buffalo, sil. 1.75 to 2.25	23.46 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	29.16 to 30.16

**Ferroalloys.**—Considering the inactivity which has prevailed for many weeks the market for ferromanganese shows considerably more life. In the past week sales of 400 to 500 tons are reported for early delivery, most of it stated to have been sold at around \$70, delivered, although some may have gone lower. Agents of British producers are authorized to sell the British alloy at \$65, seaboard, which is a reduction of about \$5 per ton from previous asking prices. The spiegeleisen

market is exceedingly quiet, only two carload lots having been sold in the past week at around the prevailing quotation of \$26 per ton, furnace. There has been a little more activity in 50 per cent ferrosilicon, sales of several carloads having been made between \$60 and \$65, delivered. The market is now regarded as a little firmer, the minimum quotation of one seller being advanced to \$65, delivered. There is no demand for high-grade manganese ore and quotations are nominal.

#### Ferroalloys

Ferromanganese, domestic, delivered, per ton	\$70.00
Ferromanganese, British, seaboard, per ton	\$65.00
Spiegelisen, 20 per cent, furnace, per ton	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton	\$65.00
Ferrotungsten, per lb. of contained metal	55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	16c. to 16.50c.
Ferrovandium, per lb. of contained vanadium	\$4.50

#### Ores

Manganese ore, foreign, per unit, seaboard	22.00c.
Tungsten ore, per unit, in 60 per cent concentrates	\$3.00 up
Chrome ore, 40 to 45 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per net ton, Atlantic seaboard	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per net ton, Atlantic seaboard	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>3</sub> , New York	55c. to 60c.

**Finished Iron and Steel.**—Despite the low bids which are being made on structural steel work, a very limited volume of work is coming into the market. A recent job, involving 400 tons for a savings bank in New York, was taken by an Eastern fabricator at less than \$70 per ton fabricated and erected. This compares very favorably with pre-war prices notwithstanding higher costs of steel, freight and labor. A large downtown office building erected in 1907 was taken at \$53.50 per ton fabricated and delivered. Its cost, including erection of the steel, was probably \$65 a ton or more. An award will probably be made this week of 4000 tons of steel for the Bowery Savings Bank Building, New York, this being the largest project in the market. A hotel at Washington, Pa., requires 600 tons; a school building at Middletown, N. Y., 500 tons; a publishing building at Richmond, Va., 200 tons. The Pittsburgh-Des Moines Steel Co. will fabricate 400 tons for a highway bridge in North Carolina; the Paterson Bridge Co. has been awarded 1300 tons for an apartment building on Riverside Drive, New York, and the Hinkle Iron Co. has been awarded a 300-ton office building by the Broadway-John Street Corporation. The Snare & Triest Co. is general contractor for a \$1,000,000 pier to be constructed in Philadelphia. There is no new railroad repair work in the market. Steel prices continue on about the same basis as last week, there being little business of importance to afford further test of the market. Bar iron is now obtainable at 1.70c., Pittsburgh. Plates for export have been quoted as low as 1.65c., Pittsburgh.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

**Warehouse Business.**—A much better tone pervades the market. Orders generally are slightly larger, specifying fair tonnages of one size instead of the wide range of sizes that has prevailed for some time. One mill producing cold drawn steel has reduced its price on bars from 2.80c. per lb. to 2.60c. per lb., a drop of about \$4 per ton. Business among dealers in wrought iron and steel pipe begins to show a slight improvement. One order totaling several hundred tons of pipe for an addition to a public institution at Central Islip, Long Island, was recently placed and there are some other smaller orders pending. Prices in this field are largely nominal. There is some slight shading of prices in the brass and copper market, but business as yet shows no distinct improvement from the dullness that has prevailed for some time. We quote prices on page 384.

#### Lapwelded Steel Boiler Tubes

1½ in.	+ 6
2 and 2½ in.	—12
3 to 3½ in.	—26
4 to 4½ in.	—32
Seamless steel boiler tubes, cents per ft.: 1½-in., 19c.; 2-in., 20c.; 2½-in., 22c.; 3-in., 24c.; 3½-in., 26c.; 4-in., 28c.; 4½-in., 30c.; 5-in., 32c.; 5½-in., 34c.; 6-in., 36c.; 6½-in., 38c.; 7-in., 40c.; 7½-in., 42c.; 8-in., 44c.; 8½-in., 46c.; 9-in., 48c.; 9½-in., 50c.; 10-in., 52c.	

**High Speed Steel.**—The market is dull and prices are unchanged. Quotations continue nominal at 90c. to \$1 per lb. for 18 per cent tungsten high speed steel, with some sales reported at lower prices.

**Cast-Iron Pipe.**—The chief inquiry of a municipal nature is that for seven miles of pipe for Scarsdale, N. Y., the business to be handled by a contractor. Buying by private companies continues in fair volume. We quote per gross ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30 with \$4 additional for Class A and gas pipe.

**Old Material.**—Inasmuch as the chief buying of heavy melting steel is to fill an order placed by the Bethlehem Steel Co. in July at a good price and as the freight rates are favorable the f.o.b. New York quotation has been raised accordingly. Two other eastern Pennsylvania mills have bought steel, the dealers' buying prices being \$11.50, delivered. Sentimentally the market is better and prices are tending upward.

Buying prices per gross ton, New York, follow:

Heavy melting steel	\$7.50 to \$8.50
Revolving rails	9.50 to 10.00
Rolling rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	4.50 to 5.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.50 to 9.00
Car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	\$16.00 to \$17.00
No. 1 heavy cast (columns building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

## Cincinnati

CINCINNATI, Aug. 9.

**Pig Iron.**—There are evidences that melters are getting short of iron, and sellers are having less difficulty in interesting buyers for current and future needs. The past week, by comparison with many of the preceding ones, was unusually active; and it is estimated that nearly 7000 tons were disposed of in Cincinnati and adjacent districts. Among the sales made was one to a Kentucky manufacturer of 2000 tons of Southern iron, equally divided between No. 2 and No. 2 soft, at a reduced price of \$19, Birmingham, for each grade. The same interest bought in the vicinity of 1000 tons of Northern iron, silicon, 2.25 to 2.75 per cent, at a price reported to be under \$18.50, Chicago. Other sales reported include 900 tons to a Western manufacturer, and 700 tons to an eastern Ohio melter. An Eastern pipe manufacturer is reported to have bought 500 tons of Virginia iron, and 400 tons of Southern Iron were sold into the St. Louis district. Several 100-ton lots were also taken by melters in this territory on the basis of \$18, Chicago, and \$20, Ironton. Interest in silveries, following the price reductions, was evidenced by the placing of a number of carload orders. There are few inquiries current, two from the Pittsburgh district totalling 800 tons. A Chicago district producer, who has been a very active seller, has advised that prices will be advanced 50c. to \$1 a ton, and requests that all quotations outstanding be closed or withdrawn by Tuesday morning. The feeling in the trade is that prices have about reached bottom, and this view is held not only by sellers but by many melters.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

**Finished Material.**—The improvement noted in July dwindled somewhat in the past week. Carload orders for immediate shipment is the prevailing activity. There were no exceptional sales made and while rumors of even lower prices are being heard, there is ap-



parently no basis for these in the small sales. A plate inquiry from a Louisville manufacturer for 900 tons is still pending. A few orders for sheets, some involving 100 tons, have been placed at the current schedules. There are reports that prices on galvanized sheets are being shaded and it is said that 3.85c. has been done. In the structural field several projects are up. The Big Four Railroad has taken bids on 400 tons of bridge replacement work and is inquiring for 900 tons for track elevation work in Indianapolis. There have been no lettings of prominence during the week. Some orders have been placed for wire and wire products. It is reported that plain wire has been sold at 2.25c., Pittsburgh, and rumors are current that other reductions may be made within the next week or so. Plant operations during the week will be practically unchanged, although the Ashland Steel Co. will operate its rolling mills during the next two weeks. The American Rolling Mill Co. at Middletown, operated 15 sheet mills and three jobbing mills in the past week and it is expected that they will continue for the present week. The Andrews Steel Co. and the Newport Rolling Mill Co. will be idle.

**Warehouse Business.**—Local jobbers report considerable improvement. This, no doubt, was stimulated by the lower prices quoted, jobbers having reduced their prices \$3 per ton. New prices in effect are as follows:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, \$3.25 per keg base; No. 9 annealed wire, \$3.00 per 100 lb.

**Coke.**—There has been some activity in the coke market, one seller reporting an order for 750 tons. Another booked 500 tons. Single carloads of Connellsville foundry have brought \$5 per net ton at ovens. Wise County coke is unchanged at \$5 to \$6, and New River \$1 lower at \$7.50 to \$8.50.

**Old Material.**—The local scrap market is dull, although dealers report some activity in other districts. Prices are unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bund'ed sheets	4.00 to 5.00	
Iron rails	11.00 to 12.00	
Relaying rails, 50 lb. and up.	25.00 to 26.00	
Rerolling steel rails.	10.00 to 11.00	
Heavy melting steel.	8.50 to 9.50	
Steel rails for melting.	9.00 to 10.00	
Car wheels	11.50 to 12.50	
	Per Net Ton	
No. 1 railroad wrought.	8.50 to 9.50	
Cast borings	2.00 to 2.50	
Steel turnings	1.00 to 2.00	
Railroad cast	11.00 to 12.00	
No. 1 machinery.	12.00 to 13.00	
Burnt scrap	6.50 to 7.50	
Iron axles	15.00 to 16.00	
Locomotive tires (smooth inside)	8.50 to 9.50	
Pipes and flues.	4.00 to 5.00	

## Boston

BOSTON, Aug. 9.

**Pig Iron.**—Considerable eastern Pennsylvania pig iron was sold in New England in the past week, and some Buffalo iron, in instances at materially lower prices. Three eastern Pennsylvania furnaces are actively bidding for business, one on a basis of \$18.50 furnace for No. 2 plain, another on a \$19 basis and the third on a \$20 basis, and a Buffalo producer has offered No. 2 plain iron at \$18.50 furnace in several, and in one instance at \$18.25 or \$23.71 delivered. Direct furnace representation is noted in competition with brokers who have the same iron for sale, consequently full details regarding transactions are more often than not lacking. For instance, the Gurney Heater Co., Framingham, Mass., has again purchased, this time 1500 tons, half No. 2 plain, and the remainder No. 2X, at a price understood to be well under \$20 furnace, but details are lacking. A Bridgeport, Conn., foundry bought 500 tons No. 2 plain and 100 tons malleable, and the Saco-Lowell Shops, Boston, textile machinery, 500 tons No. 1X and 200 tons No. 2 plain, it is understood from direct furnace representatives. A Providence, R. I., foundry took 400 tons No. 2X eastern Pennsylvania at

about \$19.50 furnace or \$23.56 delivered; the Framingham Foundries, Framingham, Mass., 200 tons No. 1X at less than \$24 delivered, or about \$20 furnace, and a Maine melter 200 tons eastern Pennsylvania No. 2X at less than \$20 furnace, while a southern Massachusetts foundry purchased 100 tons of No. 2X on a firm offer at \$20, a greater Boston textile machinery maker 100 tons No. 2X at \$20.50 furnace, and the Griffin Car Wheel Co., Chelsea, Mass., 250 tons Buffalo at approximately \$19 furnace. Otherwise sales were in car lots and included one of malleable to a Massachusetts foundry at \$19.50 furnace. The aggregate sales for the week are in the neighborhood of 4500 tons. Further inquiries are in the market, the total tonnage involved being about 2000 tons. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	\$23.06 to \$24.56
East. Penn., silicon 1.75 to 2.25	22.56 to 24.06
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	23.96 to 25.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

**Warehouse Business.**—Local warehouse prices on soft steel and reinforcing bars, structural shapes and plates and steel bands have been reduced very slightly. Stocks are smaller than they have been in months, and in some instances broken, yet dealers appear in no hurry to cover for future requirements. Prices on bolts and nuts, due to large stocks being carried, are still in favor of the consumer. It now develops that local stocks of wire nails are larger than heretofore supposed. These were purchased at prices considerably above ruling mill prices.

Jobbers now quote: Soft steel bars, \$2.81½ per 100 lb. base; flats, \$3.83 to \$3.93; concrete bars, \$2.50 to \$3.09; tire steel, \$4.20 to \$4.70; spring steel, open hearth, \$5.25; crucible, \$11.50; steel bands, \$3.46½ to \$3.98; steel hoops, \$4.18; toe calk steel, \$5.25; cold rolled steel, \$4.15 to \$4.65; structural steel, \$2.81½ to \$2.96½; plates, \$2.91½ to \$3.10; No. 10 blue annealed sheets, \$3.73; No. 28 black sheets, \$4.75; No. 28 galvanized sheets, \$5.75; refined iron, \$2.83 to \$4.75; best refined, \$4.75; Wayne iron, \$7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

**Coke.**—New England producers of coke are quoting spot and contract foundry fuel at \$10.66 delivered where the local freight rate does not exceed \$3.40 a ton. New business, however, is coming in very slowly, the number of firms having signed up on contracts still being more than 40 per cent less than it was a year ago. Those foundries not having signed contracts are in no hurry to do so, and spot shipments show a slight falling off, if anything, in view of the fact that the aggregate weekly foundry melt in New England is not much in excess of 15 per cent of normal.

**Old Material.**—A central Massachusetts textile machinery maker paid \$19.50 delivered for 1000 tons selected No. 1 machinery cast, and a few car lots of general run were purchased at 60c. per 100 lb. by dealers the past week. Otherwise the market on machinery cast is unchanged, foundries and yards being at a deadlock on prices, the former not being willing to sell at ruling prices and the foundries only willing to purchase at concessions. Four cars of chemical borings were taken by a dealer at \$4.10, f.o.b. shipping point, for Pennsylvania delivery, and a small tonnage of cotton ties at \$5 shipping point for Maine delivery. A round tonnage of shafting is under negotiation, but at the moment buyer and seller are quite far apart on prices. Little, if any, interest is shown in heavy melting steel by anybody.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	\$16.50 to \$17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$5.50 to \$6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00



## Cleveland

CLEVELAND, Aug. 9.

**Iron Ore.**—Receipts at Lake Erie ports for the past month were only 2,793,955 tons compared with 7,076,357 tons for July, 1920, and shipments to furnaces were 1,960,565 tons compared with 4,348,496 tons in July of last year. The receipts for the season to Aug. 1 were 7,249,435 tons compared with 17,407,792 tons to Aug. 1, 1920. Shipments to furnaces for the season to Aug. 1, 1921, were 5,707,232 tons compared with 12,597,009 tons for the preceding year. Despite the light receipts, the balance on dock Aug. 1, 1921, was greater than it was a year ago, the tonnage being 8,840,824 tons compared with 7,917,109 tons on Aug. 1, 1920. The receipts for the month at other than Lake Erie ports were 1,092,598 tons compared with 2,588,846 tons for July, 1920. Sales are very light and shipments continue to be held up on contracts. It is now estimated that the entire movement by lake for the season will be about 25,000,000 tons, or about a million tons less than the movement to Aug. 1, 1920.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

**Pig Iron.**—Favorable developments are not pronounced, but some encouragement is found in the larger number of releases on deferred shipments and in the increased number of small inquiries. Some important melters have not taken any iron on contract since last November. Inquiries range from a carload to 500 tons and all are for prompt shipment. The rule is for buyers to insist upon immediate delivery. As to prices, some concessions are being made when buyers agree to receive shipments of high priced iron. Except under such conditions, however, the usual selling price is \$20, Cleveland, for No. 2 foundry. A sale has been made as low as \$19.50 and reports are still heard of quotations of \$19. Owing to the very large accumulation of stocks in Cleveland furnace yards, it does not seem probable that there will be any advance in price for many months, but sellers are entertaining the hope that prices will not be much, if any, lower.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and \$6.67 from Birmingham:

Basic	\$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	\$20.00 to 20.50
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.00
Standard low phos., Valley furnace	36.00 to 36.25

**Finished Iron and Steel.**—The moderate improvement in sentiment and orders reported last week continues and is a little more pronounced. Inquiries cover a wider range and show much more interest on the part of buyers, but buying is still light. The most talked about business taken recently is still the 6900 tons contracted for by the Mt. Vernon Bridge Co. for the Ohio State University stadium and other work, consisting principally of shapes, and the eagerness displayed by the mills in this case shows what can be done when considerable tonnage appears. It is now generally believed that a large part of the material went to one company at 1.60c., Pittsburgh, and the remainder to another company at 1.65c. On plates the usual quotation is 1.75c., but it is evident that 1.70c. can be done. On steel bars some business is being placed at 1.75c., but reports of shading are persistent. On hot rolled strips 2.25c., or \$5 per ton below recent Pittsburgh quotations, has been done. No large structural contracts are pending and the only business in prospect is for school buildings in several northern Ohio cities. On wire products the demand is light, but \$2.75 for wire nails and \$2.50 for plain wire are firmly adhered to by the leading interest, and little is heard of shading by the independents. An interesting phase of the extreme dullness in the oil market is that it is necessitating the storage of large quantities of oil and it is expected that many large tanks will be built for this purpose.

**Warehouse Business.**—Cleveland jobbers have reduced warehouse prices on black and galvanized sheets \$5 per ton and on blue annealed from \$3 to \$4 per ton,

following the recent reductions on steel bars, plates and shapes.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

**Bolts, Nuts and Rivets.**—A number of orders releasing shipments on contracts have been received from the South. This is considered a very favorable indication. There is also a moderate improvement in inquiries. Regular quotations remain unchanged. The manufacturers say that fully 90 per cent is being done at these prices, although concessions are sometimes made for very desirable business. Local rivet manufacturing is at very low ebb, but no disposition is shown to meet the extremely low quotations reported in other markets.

**Sheets.**—The fact that the automobile manufacturers have continued to operate at a greater rate than was expected is having a favorable influence on the market for sheets, but it is generally believed that the present rate of consumption by the automobile companies will not continue and there is no prospect of other important buyers contributing to any large extent to the demand. If there is any change in quotations, it is toward firmness, the usual prices being 3c. for No. 28 black, 4c. for No. 28 galvanized and 2.25c. to 2.40c. for No. 10 blue annealed.

**Coke.**—The first inquiry for any tonnage on contract has been received but the amount is not large. The market continues inactive. The usual price for standard Connellsville coke is \$4.50 per net ton at oven, but \$4 has been named.

**Old Material.**—The scrap market is showing some signs of improvement. On limited sales, heavy melting is quoted \$1 to \$1.25 higher while advances are noted in a number of other grades. Important customers, however, still have very large accumulations, amounting in some cases to 50,000 tons.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	\$12.00 to \$12.25
Steel rails, under 3 ft.	12.00 to 12.25
Steel rails, rerolling	13.50 to 14.50
Iron rails	11.00 to 1.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.75 to 7.25
Machine shop turnings	5.00 to 6.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	7.00 to 7.25
Railroad wrought	10.50 to 11.00
Railroad malleable	11.50 to 12.50
Light bundled sheet stampings	4.00 to 4.50
Steel axle turnings	8.50 to 9.00
No. 1 cast	15.50 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

## Birmingham

BIRMINGHAM, Aug. 9.

**Pig Iron.**—From what can be gathered from various sources a business of 6000 tons was done in Birmingham pig iron in the first week of August. Heading the list was a sale of 1500 tons to a pipe interest. Others were mostly in 100-ton lots. Southern Pacific was in the market for 800 tons and all bids over \$18 were not considered, whereupon several Birmingham makers withdrew bids. A 100-ton lot of 2.75 to 3.25 per cent silicon brought \$19.50, reading back to base of \$18.50, with 50c. for silicon additions, but the average sale was at \$19 and at the end of the week that was stronger than in the beginning. Only one yard in Alabama has any No. 2 soft. Ill-assorted stocks are proving a positive handicap to melters and tend to harden prices. There seems no likelihood of lower prices. The Woodward Iron Co. blew in its second stack on merchant iron on account of bare state of yards, there being no iron on hand. Some inquiries for fourth quarter have been received. Makers will not quote for that period except at an advance of \$1 and over above present levels. A high authority makes

the statement that 80 to 85 per cent of the pig iron that is being sold and moved from Birmingham is for delivery in the South and the Southwest with some to the Pacific Coast. Present freight rates to the Middle West and the East are an embargo on Birmingham iron business in those directions. All iron and steel interests admit a positive although gradual betterment, and figure something substantial within thirty days.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25.....	\$19.00
Basic.....	18.00
Charcoal.....	32.00

**Finished Material.**—It is announced with authority that the finishing mills of the Tennessee company and its auxiliary, the Chickasaw Shipbuilding & Car Co., are on 50 per cent of capacity production. The rail mill is operating at normal, producing 6000 tons a week, the car works are putting on speed, the tie-plate plant is doubling capacity, all based on a monthly production of 55,000 tons of basic iron and 50 per cent of ingot production. Gulf States Steel Co. orders are larger and wire mills are on a five-day turn. Structural steel mills are active. Conners-Weymann Steel Co. continues operation of hoop and band mill at Woodlawn.

**Cast-Iron Pipe.**—New Birmingham base of high pressure pipe is \$35 to \$36 for 6 in. and upward. This marks another decline of \$5 a ton. National Cast Iron Pipe Co. reports 80 to 90 per cent of capacity production. The leading interest operates two shops with two idle. Sanitary pipe is fairly active with a 50 per cent production and base of \$40 with \$3 for extra heavy pipe. Prices are firm.

**Coal and Coke.**—Steam coal production is increasing and competition has cut prices to almost one-half of last year's. Standard foundry coke is at \$6. A large business in car lots for rush shipment is being done.

**Old Material.**—The scrap market is beginning to see a rift in the clouds with betterment in the steel market and promise of larger foundry operations, but no improvement has yet taken place. Prices are nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails.....	\$10.00 to \$11.00
No. 1 steel.....	9.00 to 10.00
No. 1 cast.....	15.00 to 16.00
Car wheels.....	15.00 to 16.00
Tramcar wheels.....	12.00 to 13.00
No. 1 wrought.....	13.00 to 14.00
Stove plate.....	9.00 to 10.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	6.00 to 7.00

## St. Louis

ST. LOUIS, Aug. 9.

**Pig Iron.**—The market continues extremely dull, trading being confined to scattered lots of one car to 100 tons, all for prompt shipment. Job foundries report the demand for castings at a low ebb, with new business so small that it can be dispatched with from one to two heats per week. Virtually all the stove plants, the largest consumers of pig iron in this district, are down. The leading blast furnace interest continues in blast and is storing a goodly part of its product. Sales in the week included 100 tons to a stove plant; two cars to a job foundry; one car to an Iowa implement interest and one car to a Quincy melter. There is an inquiry before the market for a car of Bessemer ferrosilicon from a local steel plant. The leading local blast furnace interest is quoting \$21.25 for 1.75 to 2.75 per cent silicon and states that it will meet all competition.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices \$2.80 freight from Chicago and \$5.74 from Birmingham:

Northern foundry No. 2.....	\$21.30 to \$21.80
Northern malleable.....	21.30 to 21.80
Basic.....	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25.....	24.74 to 25.74

**Finished Iron and Steel.**—Warehouse interests report that the recent price reductions have failed thus far to stimulate buying. The spurt of activity which featured the closing weeks of July has spent itself, leaving the market inert and featureless. About the only buying

is by the railroads, which are taking fair tonnages of materials for repairs to equipment. Shops of several Western roads have resumed activities on full time, including the chief shops of the Missouri Pacific at Sedalia, Mo. Specifications for the structural steel for the new Federal Reserve Bank's eight-story building and two buildings of the Board of Education will be made public during the next two weeks:

For stock out of warehouse we quote: Soft steel bars 2.87½¢. per lb.; iron bars, 2.87½¢.; structural shapes, 2.97½¢.; tank plates, 2.97½¢.; No. 10 blue annealed sheets, 3.62½¢.; No. 28 black sheets, cold rolled, one pass, 4.75¢.; cold drawn rounds, shafting and screw stock, 4.20¢.; structural rivets, 3.77½¢. per 100 lb.; boiler rivets, 3.87½¢.; tank rivets 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, bank, \$3.25; and tapped, \$3.00 off list.

**Coke.**—Outside of the sale of an occasional car of foundry coke for prompt shipment, the market is dead. Leading melters have stocks piled or under contract to carry them along for some months at the present rate of activity. Furnace coke is unsalable, the only plant in blast being that of the St. Louis Coke & Chemical Co., which manufactures its own fuel. The by-product plants have liberal accumulations in their storage yards. A small tonnage of foundry coke manufactured here has been sold to Pacific Coast melters and is being shipped regularly. Standard Connellsville foundry coke is quoted at from \$4 to \$4.50 ovens, with special brands as high as \$5.25. The furnace product is about \$1 lower. The leading by-product producer is selling its domestic sizes at \$8.50 per ton delivered in St. Louis.

**Old Material.**—A much better tone has come into the market for scrap iron and steel, with prices taking a sharp upward slant. The industries, while mainly idle at the moment, are looking about with the view of acquiring material. The American Car & Foundry Co., which has business booked sufficient to keep all its local plants busy from Sept. 1 to the first of the year, purchased 3000 tons of rolling mill stock this week. The American Steel Foundries is seeking rerolling rails and special steel scrap. An inquiry is before the market for 2000 tons of 60-lb. relaying rails. Other plants are quietly picking up bargains wherever they appear. Railroad offerings include the following lists: Mobile & Ohio, 425 tons; Missouri, Kansas & Texas, 950 tons; Pennsylvania, Southwestern Division, 5100 tons; Union Pacific, 750 tons and Pullman Co., 350 tons. An electric railway interest is asking bids on 1200 tons of 60-lb. relaying rails.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails.....	\$12.00 to \$12.50
Steel rails, rerolling.....	11.00 to 11.50
Steel rails, less than 3 ft.....	10.50 to 11.00
Relaying rail's standard section.....	28.00 to 30.00
Cast iron car wheel's.....	11.00 to 11.50
No. 1 railroad heavy melting steel.....	10.50 to 11.50
No. 1 heavy shoveling steel.....	9.50 to 10.00
Ordinary shoveling steel.....	9.00 to 9.50
Frogs, switches and guards, cut apart.....	10.50 to 11.00
Ordinary bundled sheet.....	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings.....	\$5.50 to \$6.00
Iron angle bars.....	10.50 to 11.00
Steel angle bars.....	9.00 to 9.50
Iron car axles.....	16.00 to 16.50
Steel car axles.....	11.50 to 12.00
Wrought iron arch bars and transoms.....	13.00 to 13.50
No. 1 railroad wrought.....	10.00 to 10.50
No. 2 railroad wrought.....	8.50 to 9.00
Railroad springs.....	10.00 to 10.50
Steel couplers and knuckles.....	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside.....	8.50 to 9.00
Cast iron borings.....	5.50 to 6.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers cut in sheets and rings.....	5.00 to 5.50
No. 1 railroad cast.....	12.00 to 12.50
Stove plate and light cast.....	10.50 to 11.00
Railroad malleable.....	8.50 to 9.00
Agriculture malleable.....	8.50 to 9.00
Pipes and flues.....	7.00 to 7.50
Heavy railroad sheet and tank.....	5.00 to 5.50
Light railroad sheet.....	3.00 to 3.50
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	4.00 to 4.50
Country mixed iron.....	7.50 to 8.00
Uncut railroad mixed.....	8.00 to 8.50
Horseshoes.....	10.50 to 11.00
Railroad brake shoes.....	8.00 to 8.50



## Philadelphia

PHILADELPHIA, Aug. 9.

For the first time in a year or more there has been a slight flurry of pig iron buying in this market. A sale of 5000 tons of basic by two furnaces to an Eastern steel company is the first transaction in steel-making iron of that size in a considerable time. Probably 10,000 tons or more of foundry iron has been sold within the week, mostly at prices which proved so attractive to consumers that some took more than their immediate requirements called for. One maker of foundry iron made prices as low as \$18.50 on No. 2 plain and \$19 on No. 2X to move a tonnage quickly. Other furnaces have not quite met these prices, but are within about \$1 of them.

**Pig Iron.**—Sales of pig iron in this market within the past week have totaled upward of 15,000 tons, the best record in many months. All of this business, however, was taken at the expense of prices, which are off from \$1 to \$2 a ton compared with last week's quotations. The largest purchase was 5000 tons of basic by an Eastern consumer, the tonnage being divided about equally between two furnaces. The price paid was \$19, furnace, which is a new low record on this grade of iron. Foundry iron also struck new low levels, \$18.50, furnace, for No. 2 plain and \$19, furnace, for No. 2X. Sales at this price were made by one furnace, which placed a block of 10,000 tons in the hands of a leading selling agency with which it is not regularly identified with instructions to convert it quickly into cash. The first offerings were on the basis of \$19 for No. 2 plain and \$19.50 for No. 2X. One sale of 1500 tons of No. 2 plain was made at \$19, furnace, and other smaller sales, including one of 500 tons, were made at the same prices. Then another half dollar was lopped off to bring out more buyers. The selling agency handling the iron has offices in Boston, New York and Philadelphia, hence the offerings have been freely made throughout the whole Eastern territory. Other Eastern furnaces have not gone to such low levels but have passed up considerable tonnage which they might have had by meeting competition. One furnace which is quoting \$20, furnace, on either No. 2 plain or No. 2X, is for the first time this year willing to sell for forward delivery and has taken some business running into fourth quarter. A few sales of copper bearing low phosphorus iron have been made at \$35, furnace. A leading maker of standard low phosphorus now quotes \$36.50, furnace, on that grade. Gray forge has been sold at about \$22, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton.

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$19.34 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.84 to 21.26
Virginia No. 2 plain, 1.75 to 2.75 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	20.26
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

**Coke.**—Considerable variation in coke prices, according to grades, is noted. Foundry coke of ordinary quality is obtainable at \$3.75, Connellsville, while some of the better grades are selling for \$4.50 and \$5. Furnace coke of ordinary grade can be had at \$2.60, Connellsville, though a better quality sells for \$3.

**Ferroalloys.**—Eastern producers of ferromanganese now quote \$70 per ton for delivery as far west as the Pittsburgh district and \$75, delivered in the Chicago district. Reports of resale ferromanganese at as low as \$65, delivered, are not confirmed. The lowest quotation reported on imported ferromanganese is \$67.50, Atlantic seaboard. Spiegeleisen is quoted at \$27, furnace, for 18 to 22 per cent, with some lower grade material available at \$25.

**Semi-Finished Material.**—There is practically no inquiry for billets, which are nominally quoted at \$30, Pittsburgh, for rerolling and \$35 for forging quality. Eastern mills find it impossible to compete on sheet bars, which are reported to have been sold below \$30, Youngstown.

**Plates.**—On the ordinary small lots which constitute the sole activity in the present market mills are quite uniformly quoting 1.85c., Pittsburgh.

**Structural Material.**—Reports of shading on plain material are commonly heard, but are difficult to confirm as the mills are making a determined effort to hold the price at 1.85c., Pittsburgh. Small orders are being booked at this figure; large tonnages might bring out lower quotations. Bids have gone in on an office building for Heymann & Brothers, Philadelphia, 300 tons, and for a bank building at Atlantic City, 300 tons.

**Bars.**—Though reports of 1.70c., Pittsburgh, on steel bars are heard, Eastern mills generally assert that their minimum is 1.75c. Very little business is being booked. Spring steel is selling on the bar base plus 15c. per 100 lb. Cold drawn steel can be had at 2.50c., Pittsburgh. Bar iron has been quoted at 1.70c., Pittsburgh, or 2.05c., Philadelphia, but buyers are taking little interest.

**Railroad Supplies.**—Railroad spikes are being bought by Eastern roads on the basis of 2.75c., Pittsburgh. Track bolts are quoted at 4c. to 4.25c., Pittsburgh.

**Bolts, Nuts and Rivets.**—Large machine bolts are being quoted by Eastern makers at 65-10-5 per cent off list, but this does not appear to be the minimum. Structural rivets are 2.50c. to 2.85c., Pittsburgh, and boiler rivets 2.60c. to 2.75c., Pittsburgh.

**Sheets.**—Ruling quotations on sheets are 2.25c. for blue annealed, 3c. on black and 4c. on galvanized, but these prices, particularly on black and galvanized, are being shaded at least \$2 or \$3 a ton.

**Warehouse Prices.**—Local warehouses have marked up bar iron \$2 a ton in line with steel bars, but this is the only price change of the week. Business shows no expansion. We quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.75c.; round edge iron, 3.05c.; round edge steel, iron finish, 1½ in. x ¼ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets No. 28 gage, 4.35c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ½-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

**Old Material.**—Scrap prices show an upward trend whenever the slightest demand springs up from any quarter. An Eastern mill came into the market a few days ago for cast iron borings, forcing an advance of 50c. per ton. Owing to the great curtailment in machine-shop operations borings are not being produced in sufficient volume to create a surplus. An Eastern steel mill came into the market for steel scrap at \$11, but apparently has not been able to obtain any at that price. Another mill has offered \$11.50 for small lots and that price appears to be the bottom at the moment. Advances of 50c. a ton are also recorded on machine-shop turnings and wrought iron and steel pipe. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$11.50 to \$12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.00 to 7.50
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market



# Prices Finished Iron and Steel, f.o.b. Pittsburgh

## Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia .....	\$0.35	St. Paul .....	\$0.665
Baltimore .....	0.335	Omaha .....	0.815
New York .....	0.38	Omaha (pipe) .....	0.77
Boston .....	0.415	Denver .....	1.35
Buffalo .....	0.295	Denver (wire products) .....	1.415
Cleveland .....	0.24	Pacific Coast .....	1.665
Cincinnati .....	0.325	Pacific Coast, ship plates .....	1.335
Indianapolis .....	0.345	Birmingham .....	0.765
Chicago .....	0.38	Jacksonville, all rail .....	0.555
St. Louis .....	0.475	Jacksonville, rail and water .....	0.46
Kansas City .....	0.815	New Orleans .....	0.515
Kansas City (pipe) .....	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 7c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 21c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

## Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 1.85c.

## Wire Products

Wire nails, \$2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.50; galvanized wire, \$3; galvanized barbed wire, \$3.40; galvanized fence staples, \$3.40; painted barbed wire, \$2.90; polished fence staples, \$2.90; cement-coated nail's per count keg, \$2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70 1/2 per cent off list for carload lots, 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

## Bolts, Nuts and Rivets

Large structural and ship rivets.....\$2.65  
Large boiler rivets.....\$2.75  
Small rivets.....65, 10 and 10 per cent off list  
Small machine bolts, rolled threads, 70 and 7 1/2 per cent off list  
Small sizes in cut threads.....65 and 10 per cent off list  
Longer and larger sizes of machine bolts.....65 and 10 per cent off list

Carriage bolts, 3/4 in. x 6 in.:  
Smaller and shorter, rolled threads, 65 and 10 per cent off list  
Cut threads.....60 and 10 per cent off list  
Longer and larger sizes.....60 and 10 per cent off list  
Lag bolts.....70 per cent off list  
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list  
Other style heads.....20 per cent extra  
Machine bolts, c.p.c. and t. nuts, 3/8-in. x 4-in.:  
Smaller and shorter.....60 and 5 per cent off list  
Longer and larger sizes.....60 per cent off list  
Hot pressed sq. or hex. blank nuts.....\$4.60 off list  
Hot pressed nuts, tapped.....\$4.25 off list  
C.p.c. and t. sq. or hex. nuts blank.....\$4.60 off list  
C.p.c. and t. sq. or hex. nuts, tapped.....\$4.25 off list  
Semi-finished hex. nuts:

1/4 to 9/16 in. inclusive U. S. S., 80, 10 and 10 per cent off list  
Same sizes S. A. E., 80, 10, 10 and 10 per cent off list  
5/8 to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list  
Stove bolts in packages.....80 and 10 per cent off list  
Stove bolts in bulk.....80, 10 and 2 1/2 per cent off list  
Tire bolts.....65, 10 and 10 per cent off list  
Track bolts.....3.80c. base

## Square and Hex. Head Cap Screws

1/2 in. and under.....70 per cent off list  
9/16 in. to 3/4 in.....70 per cent off list

## Set Screws

1/2 in. and under.....70 and 5 to 70 and 10 per cent off list  
9/16 in. to 3/4 in.....70 per cent off list

## Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

## Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$42; chain rods, \$42; screw stock rods, \$47; rivet and bolt rods and other rods of that character, \$42; high carbon rods, \$50 to \$54, depending on carbons.

## Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 3/4-in. and 7/16-in., \$2.75 base; 5/16-in., \$2.75 base. Boat and barge spikes, \$3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3.80 base per 100 lb. Tie plates, \$2 to \$2.05 per 100 lb.

## Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$11.30 per package; 8-lb. coating, 1 C., \$11.60; 15-lb. coating, 1 C., \$14.30; 20-lb. coating, 1 C., \$15.55; 25-lb. coating, 1 C., \$16.80; 30-lb. coating, 1 C., \$17.80; 35-lb. coating, 1 C., \$18.80; 40-lb. coating, 1 C., \$19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

## Iron and Steel Bars

Steel bars, 1.75c. from mill. Annealed bar iron, 2.25c.

## Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	50 1/2	24	1/4 to 3/8	+ 1 1/2	+ 2 1/2
1/4 to 3/8	53 1/2	27	3/8	31 1/2	13 1/2
1/2	58 1/2	44	3/4	37 1/2	22 1/2
3/4	62 1/2	50	1 to 1 1/4	39 1/2	24 1/2
1 to 3	64 1/2	52			

## Lap Weld

2	56 1/2	41	2	34 1/2	20 1/2
2 1/2 to 6	60 1/2	48	2 1/2 to 6	37 1/2	24 1/2
7 to 12	57 1/2	44	7 to 12	35 1/2	22 1/2

## Butt Weld, extra strong, plain ends

1/4	46 1/2	29	1/4 to 3/8	+ 9 1/2	+ 12 1/2
1/4 to 3/8	49 1/2	32	3/8	30 1/2	18 1/2
1/2	55 1/2	44	3/4	37 1/2	23 1/2
3/4	60 1/2	49	1 to 1 1/4	39 1/2	25 1/2
1 to 1 1/2	62 1/2	51			
2 to 3	63 1/2	52			

## Lap Weld, extra strong, plain ends

2	54 1/2	43	2	35 1/2	22 1/2
2 1/2 to 4	58 1/2	47	2 1/2 to 4	38 1/2	26 1/2
4 1/2 to 6	57 1/2	46	4 1/2 to 6	37 1/2	25 1/2
7 to 8	53 1/2	40	7 to 8	30 1/2	18 1/2
9 to 12	48 1/2	35	9 to 12	25 1/2	13 1/2

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2 1/2 per cent.

## Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
1 3/4 in.	21 1/2	1 1/2 in.	List
2 to 2 1/4 in.	36	1 3/4 to 1 7/8 in.	10
2 1/4 to 3 in.	47	2 to 2 1/4 in.	20
3 1/4 to 13 in.	52	2 1/4 to 3 in.	25
		3 1/4 to 4 1/2 in.	27

## Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

## Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh follow:

Blue Annealed		Pass Cold Rolled	
Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30	No. 11 and 12	2.50
Nos. 9 and 10 (base)	2.40	No. 13 and 14	2.60
		Nos. 15 and 16	2.70
Box Annealed, One		Pass Cold Rolled	
Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70	No. 28 (base)	3.00
Nos. 22 to 24	2.75	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		
Galvanized		Tin-Mill Black Plate	
Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	No. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30 1/2 and 31	3.10

## Non-Ferrous Metals

### The Week's Prices

Cents Per Pound for Early Delivery

Aug.	Copper, New York		Lead			Zinc	
	Lake	Electro-lytic	Tin New York	New York	St. Louis	New York	St. Louis
8	12.00	11.75	25.87½	4.40	4.20	4.70	4.20
9	12.00	11.75	26.25	4.40	4.20	4.70	4.20
10	12.00	11.75	26.50	4.40	4.20	4.70	4.20
11	12.00	11.75	27.75	4.40	4.20	4.70	4.20
12	12.00	11.75	27.75	4.40	4.20	4.70	4.20

### New York

NEW YORK, Aug. 9.

A better feeling pervades all the markets and buying is in larger volume. Sellers of copper willing to do business at present levels report a fair business with the market firmer. Demand for tin continues moderate with prices higher. The lead market is slightly firmer but quiet. Inquiry for zinc is increasing and prices are steady.

**Copper.**—There has been more inquiry in the past week from consumers who have been bidding 11.75c., delivered, for electrolytic copper with practically no success and it is stated by one or two sellers that buyers are now willing to pay 12c., delivered, and that there is a fairly good business both for domestic and foreign accounts. It is acknowledged that over 1,000,000 lb. of copper was sold last week to a large consumer at 11.87½c., delivered, or ¼c. below the market price, but this is considered to have been a "freak" sale, the seller being compelled to dispose of it for cash. It is declared impossible to buy electrolytic copper below 12c., delivered, and some of the large producers are out of the market at this level. While demand is better it is not large, but interest on the part of consumers is improving. Ocean freight rates have been reduced from \$9 to \$5.50 per ton, which, it is hoped, will stimulate foreign trade.

**Tin.**—The middle of last week business aggregating about 350 tons of Straits tin for shipment from the East was sold at prices ranging from 26.25c., delivered, down to 25.75c. f.o.b. New York. Aside from that the market has been inactive. Yesterday prices took a sharp advance, due to a rise in London of sterling and the advance in rates for sterling exchange. At the new level a fair business was done in this market at 27.25c. to 27.75c. for future shipment. Spot Straits tin to-day is quoted at 27.75c., New York, and the London market is about £4 per ton higher than a week ago, with spot standard at £162 10s., future at £164 10s. and spot Straits at £163 5s. Arrivals thus far this month have been 360 tons with 4010 tons reported afloat, which is regarded as unusually large under the circumstances.

**Lead.**—The market is steady and featureless. Some sellers report more inquiry and a tendency to firmness, but quotations are unchanged at 4.40c., New York, or 4.20c., St. Louis, in the outside market, with that of the leading interest still 4.40c., both New York and St. Louis.

**Zinc.**—Sellers of prime Western report inquiry on the increase and of a decidedly better character than in some weeks. Both galvanizers and brass makers, largely the former, are showing more interest and some sales have been made for August shipment at 4.20c. to 4.25c., St. Louis, or 4.70c. to 4.75c., New York, and also some for September shipment at about five points above the August price.

**Antimony.**—There is no change in the market with wholesale lots for early delivery quoted at 4.60c., New York, duty paid.

**Aluminum.**—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots

for early delivery at 24.50c. f.o.b. plant. Importers of the same grade are asking from 21c. to 23c., New York.

**Old Metals.**—Business is still impossible with the market slowly declining. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

### Chicago

AUG. 9.—Copper has declined, while tin and lead are higher. Tin has been very low and reacted upward, as was expected in many quarters. Lead is in a better position than most other metals, because consumption has been heavier and stocks are generally low. White lead plants, for example, have been quite busy until recently, reflecting a substantial demand for paint this summer. Old metal prices are unchanged. We quote Lake copper at 12.50c. in carload lots; tin, 29c. to 29.50c.; lead, 4.37½c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

### St. Louis

AUG. 9.—The market for lead and slab zinc remains dormant, the usual consumers showing absolutely no interest either in futures or spot. Producers are marking time, and making no effort to press their metal for sale. Independents declare they are losing money on every pound they sell at present prices. Lead is quoted at 4.20c. and zinc at 4.20c., car lots. We quote Lake copper car lots at 12.73c. to 12.98½c.; tin, 27.36c., and antimony, 5.38½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c., and aluminum, 9c.

### Belgian Blast Furnaces Operating

The following list shows the furnaces in operation in Belgium July 1, 1921:

Forges of Halanzy: 1 furnace producing 90 tons of foundry pig iron per 24-hr.

Forges of Espérance Longdoz: 2 furnaces producing 300 tons.

Forges of Angleur: 2 furnaces producing 200 tons.

Cockerill Works: 1 furnace producing 170 tons of foundry iron and 76 tons of steel-making iron.

Forges of Clabecq: 1 furnace producing 180 tons of steel-making iron.

Forges of Providence: 2 furnaces; one producing 207 tons of foundry iron; the other 155 tons of steel-making iron.

Usines du Hainaut: 1 furnace producing 120 tons of foundry iron.

Sambre et Moselle: 3 furnaces producing 450 tons of steel-making iron.

Output has still further been curtailed and two or three furnaces have been blown out in the districts of Liège and Charleroi.

The Société Franco-Belge de Matériel de Chemins de Fer in Raismes has practically finished the reconstruction of its works. It is reported that the output of the reconstructed works will reach 100 locomotives per year, compared with a pre-war capacity of 60 locomotives. Works and sheds are planned with a capacity of 200 passenger cars and 3000 trucks.



## PERSONAL

Bradley Stoughton, Engineering Societies' Building, 29 West Thirty-ninth Street, New York, having resigned after more than eight years as secretary of the American Institute of Mining and Metallurgical Engineers, will resume his practice as a consulting engineer, making a specialty of financial investigations and reports to bankers, investors, directors, trustees and examining accountants on industrial plants, engineering enterprises, iron and steel plants, etc.

Joshua A. Hatfield, president American Bridge Co., sailed recently to Europe on business and pleasure.

B. D. Lockwood has resigned as chief engineer of the Pressed Steel Car Co., Pittsburgh, and J. F. Streib, formerly assistant chief engineer, has been named to succeed him.

Isaac Harter, assistant to the president Babcock & Wilcox Co., New York, boilers, stokers, etc., has been appointed general superintendent of the company.

J. A. Henry has been appointed Western district manager of the Warren Iron & Steel Co., Warren, Ohio, with offices at 1810 Continental & Commercial Bank Building, Chicago, 'phone Harrison 2541. Mr. Henry has been Cincinnati district manager for the American Rolling Mill Co. and general manager of the Indiana Rolling Mill Co.

Robert R. Carter, covering the southern Indiana territory for the Van Camp Hardware & Iron Co. for six years, has resigned to accept a position as manager for the Weber Tire & Accessory Co., Evansville, Ind., southern Indiana distributor for the Lee Tire & Rubber Co.

Joseph W. Powell, until recently vice-president of the Bethlehem Shipbuilding Corporation, has been appointed by Chairman Lasker of the United States Shipping Board to take charge of the financial, accounting and sales department of the Emergency Fleet Corporation. Mr. Powell, who will serve the Government without salary, will devote several months of his time to bringing about a complete and business-like reorganization of the department which he heads. In commenting upon the appointment Chairman Lasker said that Mr. Powell some time ago had been tendered the position of senior vice-president and general manager of the Emergency Fleet Corporation at a large salary, but found it impossible to accept. He was prevailed upon, however, to assist in the board's proposed reorganization of the Fleet Corporation and will join the organization about Sept. 1. Mr. Powell is 44 years of age, a Naval Academy graduate, and was a member of the construction corps of the navy when he resigned in 1906 to accept a position with the William Cramp & Sons Ship & Engine Building Co. In 1914 he became president of the Fore River Shipbuilding Corporation and in 1917 was put in charge of the five shipbuilding properties belonging to the Bethlehem interests. He organized and operated these properties throughout the war, and until his retirement early this year.

Arthur R. Markel has been transferred by the Columbus McKinnon Chain Co., Columbus, Ohio, from the position of secretary to that of assistant to the president. Don S. Brisbin, formerly assistant sales manager of the McKinnon Industries, Ltd., St. Catharines, Ont., goes to Columbus as director of sales.

Dr. Richard Moldenke last week was a guest at luncheon of the Worcester, Mass. members of the New England Foundrymen's Association, at the rooms of the Worcester Metal Trades Association, that city. H. P. Blumenauer, general manager Arcade Malleable Iron Co., presided. Dr. Moldenke spoke on foundry costs and on his observations of conditions in Europe, gathered during a trip from which he recently returned.

Ross C. Purdy, formerly director of research Norton Co., Worcester, Mass., and for the past two years

consulting ceramist in Buffalo and elsewhere, has been made permanent general secretary of the American Ceramic Society, of which he was president in 1909 and 1910.

H. W. Thompson, 503 Mining Exchange Building, Denver, Colo., has been appointed sales representative in that territory for the M. H. Detrick Co., 155 East Superior Street, Chicago, maker of arches and steam jet ash conveyors.

I. F. Baker, general superintendent Lynn Works, General Electric Co., is convalescing following a minor operation, performed recently.

Harvey J. Mallory has been elected vice-president of the Buick Motor Car Co., Flint, Mich., succeeding C. S. Mott, who was recently made chairman of the advisory committee of the General Motors Corporation. Mr. Mallory will also continue his former duties as controller of the Buick company.

S. V. McLeod has been appointed purchasing agent for the Algoma Steel Corporation, Sault Ste. Marie, Ont.

Homer A. Pardee, general manager of the Halcomb plant of the Crucible Steel Co. of America, Syracuse, N. Y., has been appointed manager of the Park works of the company at Pittsburgh, succeeding George I. Page, who has resigned his position at the Park works. Assistant Manager James A. Scott of the Park works has also resigned.

Robert B. Woodworth, sales statistician and advertising manager of Carnegie Steel Co., will have completed 24 years affiliation with that company on Aug. 16 and on the following day retires from active participation in the steel business. He has occupied an unique position with the Carnegie company in that he directly supervised all technical publications of the company, was the author of many of them, had charge of all the advertising copy and also was the originator of the all-steel drilling rig, steel derrick, sheet steel piling driving caps and steel timbers for mines. He also worked out the details for some of the earliest examples of fireproof partitions in office buildings, built with sheet steel studding and expanded metal laths. He devised and installed for the Carnegie Steel Co. a system of trade records covering the consumption and production of all kinds of heavy rolled steel products in the United States, classified by lines of trade down to the individual requirements of separate purchasers. This system, since improved and extended, is believed to be the most complete in the industry. During the war he was in Washington, where he helped develop the American standard practice for ordering ship steel which was adopted by the Emergency Fleet Corporation and the observance of which by American shipbuilders is said to have increased the production of ship plates at least 10 per cent. Mr. Woodworth was born April 28, 1868, in Winchester, Va. He was educated in the schools at Burlington and Moorefield, W. Va., and entered Hampden-Sidney College as a junior, from which he was graduated in June, 1886. In 1893 he was awarded a master of arts degree by Princeton University, where he pursued a post-graduate course. Prior to entering the service of the Carnegie Steel Co. he had been with the West Virginia Central Railroad, now the Western Maryland Railroad, the Brown-Ketchman Iron Works, Indianapolis, the Elmira Bridge Co., Elmira, N. Y., and the Central Bridge & Engineering Co., Peterborough, Can. He entered the employ of the Carnegie company as a draftsman and was successively chief draftsman and engineer to the general sales department, having oversight of orders for fabricated structural materials. Since Oct. 1, 1917, he has been advertising manager and sales statistician.

Committee A1 on Steel of the American Society for Testing Materials is planning to extend its activities to include the study of tests and specifications for sheet steel. Inquiries received by the society have indicated a need for information concerning this product. A representative sub-committee is being organized.

### Changes in Republic Sales Organization

Wilber B. Topping, general manager of sales of the Republic Iron & Steel Co., Youngstown, Ohio, announces the following changes in the sales organization of the company, effective Sept. 1. Charles S. McKinley has resigned as assistant manager of sales and will be succeeded by Walter W. Hall of the Pittsburgh office, who will become assistant to the general manager of sales, and be located in Youngstown. Frank Welsh, formerly with the Republic company, will succeed Mr. Hall as assistant manager of sales in the Pittsburgh office. Frank L. Rownd has been transferred from the operating department at the Niles, Ohio, sheet mills to the sales department, in the sheet division.

Mr. McKinley will become associated with his brother, A. E. McKinley, a professor at the University of Pennsylvania, in the management of the McKinley Publishing Co., Philadelphia, and will assume active charge of the business. The company produces school supplies, maps and other printed products. He has been associated with the Republic company since 1913, starting in the Philadelphia office where he remained for two years, when he was transferred to Pittsburgh and became manager of sales in that district. On Jan. 1, 1919, he was transferred to Youngstown as assistant manager of sales.

Except for a period of slightly more than two years when he was associated in the Columbia Steel & Shafting Co., Pittsburgh, Mr. Hall has been continuously identified with the Republic company since 1899. He was originally located in the Chicago office of the Republic company and was subsequently transferred to Pittsburgh.

Mr. Welsh previously was connected with the sales department of the Republic company for seven years, resigning Dec. 1, 1917, to engage in the export business in New York. He later became manager of the New York office of the Hickman-Williams Co. His most recent affiliation was the Detroit Graphite Co., which he represented in the Pittsburgh district.

Mr. Rownd has been with the Republic company for two years in various operating capacities in the Niles sheet mill works.

### British Iron and Steel Market

(Continued from page 361)

last week. Welsh works have secured orders from the Far East at £21 (3.43c. per lb.) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$3.66 per £1 as follows:

Durham coke	£2 2	\$7.69
Cleveland basic	7 7½ & £7 10*	26.99 & \$27.45
Cleveland No. 1 foundry	7 0	25.62
Cleveland No. 3 foundry	7 0 & 7 5*	25.62 & 26.54
Cleveland No. 4 foundry	7 0 & 7 5*	25.62 & 26.54
Cleveland No. 4 forge	5 17½	21.50
Hematite	7 0*	25.62
East Coast mixed	8 0 & 7 5*	29.28 & 26.54
Ferromanganese	18 0 & 14 10*	65.88 & 53.07
Rails, 60 lb. and up	10 10 to 14 0	38.43 to 51.24
Refractories	9 0 to 9 10	32.94 to 34.77
Sheet and tin plate bars		
Welsh	9 0 to 9 10	32.94 to 34.77
Tin plate base box	1 3 to 1 5½	4.21 to 4.67
C. per Lb.		
Ship plates	14 0 to 15 0	2.29 to 2.45
Boiler plates	19 0 to 21 0	3.10 to 2.43
Tees	14 0 to 15 10	2.29 to 2.53
Channels	13 5 to 14 15	2.17 to 2.41
Beams	13 0 to 14 10	2.12 to 2.37
Round bars, ¾ to 3 in.	13 0 to 13 10	2.12 to 2.21
Galvanized sheets, 24 g.	22 0	3.59
Black sheets	17 10	2.86
Steel hoops	17 0	2.78
Cold rolled steel strip, 20 g.	26 10	4.33

\*Export price.

### Fuel Cost Retarding Resumption of Blast Furnaces—Continent Getting Most Business

LONDON, ENGLAND, July 27.—The long-looked for revival does not show yet any evidence of having arrived. There seems to be more activity in certain of the overseas markets, particularly in the East, and a good deal of miscellaneous inquiry is appearing. It is generally noticeable, however, that the business is slow to mature.

The universal cry is that fuel is too dear to enable manufacture of iron, steel or any other products to be carried on at such a price as would enable producers to compete with the continent. It looks as if, after the first rush for coal supplies is satisfied, the market for fuel will become dull and perhaps eventually prices will, by that means, come to an economic level.

A few furnaces have been started on pig iron, but as a rule, iron-masters seem determined to keep the blast furnaces idle until fuel comes to such a level that pig iron may be made at a profit. What this level is, it is difficult to say, but the general feeling seems to be that pig iron at 120s. per ton cannot be made without loss unless coke can be had at a price of 30s. per ton, delivered. As the present price of coke is about 42s. 6d., it will be seen that a considerable reduction is necessary. On the other hand, continental foundry iron is obtainable at about 100s. c.i.f. Middlesbrough, so that it looks as if fuel would need to come down even lower than the figure mentioned, as 120s. for pig iron is obviously not a competitive figure. At the moment stocks of good grades of foundry iron are scarce. There is no No. 1 to be had and for Nos. 3 and 4, 135s. has to be paid. The market has a temporary appearance of firmness therefore due to a slight demand arising from the resumption of work at the foundries.

In finished steel the general tendency of manufacturers is to go slow in resuming. There is a fair amount of business being done, but the continent is getting nearly all the orders. Although there is some inquiry, the aggregate does not look as if it would keep British works going very long.

It is reported that William Jessopp & Sons, one of the largest makers of crucible steel in Sheffield, have decided to close indefinitely during the present depression. This affects about 1500 employees. The firm's customers have been asked to place their requirements elsewhere for the present.

The shipbuilding position is far from satisfactory owing to the scarcity of new orders, but the shipping under construction in the United Kingdom at the end of June amounted to 789 vessels of 3,530,047 tons. The tonnage now under construction is less by about 268,000 tons than that being built at the end of the March quarter and about 48,000 tons less than that under construction 12 months ago. It is pointed out, however, that the figures can only be regarded as nominal, as the total includes a considerable amount of work which has been suspended owing to the decline in demand for tonnage, also a large quantity the completion of which has been postponed owing largely to the stoppage of work by the joiners' and the coal trouble. The tonnage on which work has been suspended amounts to 735,000 tons and the shipping which has been delayed in completion to 444,000 tons. These figures have to be deducted in order to enable a comparison to be made with figures for normal times. There is thus given a real total of 2,351,000 tons under construction in the United Kingdom.

### OBITUARY

FRANK ERNEST WOODWARD, Wellesley Hills, Mass., died Aug. 5 at the New England Deaconess Hospital, Brookline, from the effects of an accident with which he met the previous week. Mr. Woodward was born in Damariscotta, Me., Jan. 2, 1853. At the age of 18 years he entered the employ of the Magee Furnace Co., Boston, became a member of the corporation in 1887, and in 1895 was in charge of the heating and ventilating department. In 1905 he organized the firm of Frank E. Woodward & Co., heating and ventilating engineers.

WILLIAM WILSON LIGHTHIPE, manager of the general service department of the Otis Elevator Co., died at the Long Island College Hospital, Aug. 7, aged 44. Mr. Lighthipe attended Trinity School and graduated from Columbia University in 1898. He was a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, Sons of the American Revolution and other organizations.



## SLIGHT LULL IN EXPORTS

Far Eastern Buying Somewhat Less—Foreign Ore Imports Possible in a Few Months—Japanese Rail Inquiry

NEW YORK, Aug. 9.—There has been a slight lull in new inquiries for iron and steel from the Far Eastern markets. While South American markets are buying small tonnages of various materials, a large portion of these orders is being placed with European sellers, because of the lower prices and better credit terms. Importations of foreign pig iron, chiefly of Belgian origin, while profitable at present for Pacific coast consumers, cannot be done in competition with Eastern furnaces on the Atlantic coast. Importers in New York believe, however, that with declining European prices, in a few months it may be possible to put down foreign iron ore at Atlantic coast ports sufficiently cheap to interest American consumers. Ores considered the most favorable for such importation are those from Spain and northern Africa, which should be available at from 8c. to 10c. per unit.

### Japanese Buying Light

Japanese buying continues on a slightly smaller scale. Orders for copper are still being placed in this country, one New York exporter having booked an order during the past week for 200 tons of electrolytic copper to a Japanese buyer. The South Manchurian Railroad continues to buy lightly and an inquiry is being handled

by one Japanese export house for about 5 miles of 60-lb. rails and 5 miles of 75-lb. rails. An inquiry is in the hands of the American subsidiary of a French interest, calling for about 40 passenger cars for a Chinese railroad.

### Mexican Situation Improves

According to the report of the representative in Mexico of a large American bank, economic and political conditions there are good and progress under the present administration rapid. Train schedules throughout Mexico are greatly improved and receipt of the locomotives and rolling stock purchased in the United States recently is expected to relieve all congestion at the ports. He adds that the administration is preparing to make payments on all foreign debts.

The Bombay water supply pipe line bids show a great divergence. It is understood that one American bid for the pipe line, fabricated and set in place, was somewhat over \$11,000,000, while the bid of Braithwaite & Co., West Bromwich, England, was something over \$5,000,000. This low bid was for riveted pipe, while the American bid was for the lock bar construction. Allowing in the case of the English bid some \$2,000,000, which it is estimated will be less than the cost of laying the pipe, there is left over \$3,000,000 for the material fabricated delivered. As there are about 80,000 net tons of material involved, it would appear that the unit cost of the fabricated steel pipe is about 2c. a lb. delivered. These figures are as yet unofficial. It may be added that the work will take 2½ to 3 years for completion.

## IMPROVEMENT IN GERMANY

Price Trend Is Generally Upward—Ore Prices Decline—Jobbers Cut—Associations Formed

(By Aerial Mail to London)

BERLIN, GERMANY, July 25.—It is now generally admitted that a considerable betterment in the tone of the market has taken place and with prices exhibiting a strong upward tendency and a steadily increasing volume of business, the activity of the past fortnight augurs well for the future. Warehouse stocks are being rapidly cleared away and short-term deliveries are difficult to obtain, about 4 weeks being named for beams and girders and 8 to 16 weeks for bar iron and light plates. The Tube Convention has decided upon price advances for gas pipes and boiler tubes averaging 5 per cent and there are rumors of the establishment of a tube syndicate.

### Ore Prices Declining

The Berg- und Hüttenmännische Verein, according to a report from Wetzlar, has reduced prices for Lahn red iron stone for the third quarter of 1921 from 238 m. to 214.30 m. per ton for 45 per cent ores and from 173 m. to 147.05 m. for 40 per cent, all f.o.b. mine head. This reduction was caused by foreign competition. Because of the precarious situation of the mining industry, representatives of labor have been urging the Government to compel smelting works to accept a certain percentage of the output of Lahn ores. Smelters have refused on the grounds that foreign ores are offered at considerably lower prices and that the poor quality of the expensive Lahn ores has resulted in losses. The Lahn red iron stone of 40 per cent iron and lower has a high silicon content which renders it, even at low prices, rather unprofitable. The Siegerland mines report improved demand. Prices for crude sparry ores and roasted ores have been reduced by 30 m. per ton as from July 1.

No important changes are noted in the pig iron market. French and Luxemburg foundry iron No. 3 are offered as low as 180 to 190 fr. per metric ton, and producers are willing to make remarkable concessions on large spot orders.

### Price Cutting by Jobbers

Heavy price fluctuations in rolled material have been a feature of the market in the past week. While mill

quotations continued firm, jobbers were cutting the mill prices with a view to eliminating competition. Despite fluctuations prices are on the upward trend, and for the present there is no indication of a halt. The larger works are well stocked with orders, some even operating at capacity, and new orders in some lines will not be accepted for at least 6 weeks.

Bar iron was quoted at 1850 to 1900 m. per ton, a price not reached for some time past. Concrete bars fetched 1900 to 2000 m., while offerings of jobbers were at about 1800 m. Demand for semi-finished material also shows a notable improvement, with prices recovering. We quote billets 1490 m. and sheet bars around 1480 m. Slightly higher prices ruled for open-hearth material. The sheet market is finally showing signs of an improvement. The heavy demand for rails also formed a feature of the market.

Quotations are as follows:

	Per Metric Ton, Marks
Tees and channels .....	1 800
Angles, rounds, flats .....	1 850
Hoop iron, cold rolled .....	3 600
Rails, standard sections .....	2 350
Rails, for mines .....	2 300
Sheets, heavy .....	1 800
Sheets, medium .....	1 850
Plates, light .....	1 950

The German Iron Merchants Association at Düsseldorf has increased prices for bar iron, hoop iron and sheets for that district an average of 10 m. per 100 kg., bar iron now being quoted at 240 m. and hoops at 290 m. per 100 kg. The Bar Iron Merchants Association at Cologne has abolished the so-called guidance prices hitherto in force and fixed minimum base prices.

The Deutsch-Luxemburgische Bergwerks-und Hütten Aktien Gesellschaft in conjunction with the Bochumer Verein für Bergbau und Gusstahlfabrikation Aktien Gesellschaft and the Stahlwerke Brünninghaus Aktien Gesellschaft have established a joint sales organization under the name of Vereinigte Edlstahlwerke G.m.b.H. with the main office at Dortmund. As indicated by the name, this organization will handle the sale of refined steel produced by these works.

The two principal machine tool dealers associations are about to amalgamate. It is reported that Rhenish-Westphalian coal companies have opened negotiations with interested groups in Denmark, Sweden and Norway for the shipment of coal and coke on a large scale as soon as all reparation shipments have been concluded.

## LONG WAIT ON THE TARIFF BILL

### Much Senate Opposition—New Tax Legislation Likely to Come First

WASHINGTON, Aug. 9.—Among manufacturers opinion is growing in favor of the American valuation plan as the basis of ad valorem rates in the permanent tariff bill and in the membership of the Senate Committee on Finance there is a similar tendency. Importing interests are showing increasing opposition to the proposed system. It is now believed that if the plan as embodied in the bill passed by the House is not adopted in full it will be reported to the Senate in a modified form. The latter alternative appears to be the more likely outcome.

#### More Favor for American Valuation

The situation was summed up in substantially the above terms to-day by a prominent member of the committee, who added that he continues to have an open mind on the question. It was reiterated that in any event many rates in the House bill will have to be examined and revised downward, and it was indicated that the metal schedule will share in the changes that are to be made. It is uncertain when the hearings before the Senate committee will be completed, and consequently when the measure will be ready to be reported to the Senate. Treasury experts have prepared a modification of the American valuation plan which is said to follow the lines suggested by George C. Davis, in charge of the comparative value report bureau, customs division, Treasury Department. This would require the American producer to prove the comparability of his article with that which is imported and in competition with the domestic product. Considerable opposition to this suggestion has developed, however, and it remains to be seen what disposition will be made of it by the committee.

The Treasury experts, according to present plans, are to go into executive session to-morrow with the committee to consider the basis of fixing ad valorem rates and also to discuss the proposed dyes embargo. These matters were to have been taken up in executive session last Thursday, but owing to the great number of witnesses who desired to be heard on the embargo, hearings have been devoted to this issue.

It is hoped by the committee to act finally on both the embargo and American valuation questions by the latter part of this week and then to begin hearings as to rates in the tariff bill, with the probability that each witness will be given only a few minutes. Opportunity to submit briefs has been granted, however. It is uncertain when the metal schedule will be reached, but if the present program is followed it is expected that it will be taken up some time next week. On this basis it would seem to be the intention of the committee to report the bill to the Senate early in September, although it has been stated that no safe prophecy can be made.

#### Opposition to Tariff Bill

So much opposition to the bill has developed that it is thought it will be the object of vigorous attack in the Senate and that it will be held before that body for a long period. One Senator has said that the "snow will fly" before the bill is passed. The opposition apparently is not confined to Democrats, but some Republicans, it has been declared, show "less protective tendencies than heretofore."

Whether the tariff or the revised tax bill will take precedence depends upon the progress made with each. Chairman Fordney of the Ways and Means Committee now hopes to have the tax bill ready to report

within 10 days and to dispose of it in the House within a week after it is taken up in that branch.

This would mean that the tax bill would reach the Senate late in August, and probably before the tariff bill is reported. Inasmuch as the Senate Committee on Finance has held hearings on internal revenue, but devoted principally to the sales tax, it is believed that it would give early attention to tax legislation and might act on it before taking up the tariff. This suggestion is strengthened by reason of the insistence from the country that tax legislation be given preference.

#### Wide Variance on the Tax Bill

The difficulties of framing a tax bill are as great as are those of preparing the tariff bill. While there still is a strong opinion that proposals of the Treasury Department for revised taxation will be adopted in general, they are meeting with much opposition from several sources. It is known that some members of the House Committee on Ways and Means are not favorable to the program of Secretary of the Treasury Mellon, which would eliminate the excess profits tax, increase first class postage to 3 cents, allow an exemption of \$2,000 on corporation income with an increase from 10 to 15 per cent on corporation taxes, place a graduated tax on automobiles, reduce the transportation tax, repeal soft drink taxes, and fix a tax of two cents on bank checks, besides one or two other changes.

Agricultural and labor interests are opposed to eliminating the excess profits tax and many business interests favor a sales tax. The Chamber of Commerce of the United States and the National Association of Manufacturers are among organizations that have advocated a turnover tax. But indications are that the excess profits tax will be eliminated and that a turnover tax will not be considered further. It is realized that the excess profits tax has served its purpose, and in view of the deflation and liquidation in industry it would no longer produce the desired revenue.

### Intervention in the Pittsburgh-Plus Case May Be Permitted

WASHINGTON, Aug. 9.—Representatives of independent steel interests who were informed that the Federal Trade Commission would not permit them to intervene in the Pittsburgh-plus proceedings are now hopeful that they may be granted this privilege. A statement has been issued by the commission that it "has not ruled against intervention in the complaint against the United States Steel Corporation, on the part of independent producers." The information previously current, that it had been decided not to allow intervention and that the proceedings would be directed solely against the Steel Corporation, was considered so authoritative that independent producers had given up the idea of making formal application to intervene. It now is understood that such application will be made. When Acting Chairman Gaskill was asked if the statement just given out by the commission implied that intervention would be permitted he replied that it could not be so interpreted and that the only way to obtain a formal ruling from the commission would be through the filing of an application.

#### Sharp Cut in Shovels

The Hubbard shovel manufacturing interests, Pittsburgh, have made a radical move by taking independent action in reducing the prices on all shovels, spades and scoops \$3.40 per doz., making the present quotation \$8.50 per doz. on the fourth grade polished goods and the same pro rata reduction on other goods. There has been no previous change in prices of shovels, spades and scoops for about a year.



# Machinery Markets and News of the Works

## BUYERS GET CONCESSIONS

### Machine-Tool Orders Placed on Basis of Negotiated Prices

#### Slight Improvement Is Noted in Some Markets but Business Is Still at Low Point

Machine-tool users who are really in earnest about placing orders are finding no difficulty in obtaining attractive price concessions from many tool builders. Official prices have been changed in only a few instances, but each transaction is subject to special negotiation, with the buyer usually being able to name, within reason, his own figure.

## New York

NEW YORK, Aug. 9.

The sale of three machines at about \$20,000, made by a New York firm last week, is considered unusually good business, so dull is the machine-tool trade. Among prospective buyers are the street railroads of New York and some vocational schools in New York and Brooklyn. The Erie Railroad is asking for two lathes and the New York Central has inquired for a 42-in. lathe and a 48-in. planer. One New York seller has been asked for eight grinders by two prospective purchasers. The American Sugar Refining Co. is expected to close shortly for the machines on its list. The inquiry of the Bethlehem Steel Co. for tools for working on materials for the New York-Jersey City vehicular tunnel is still pending.

A 15 per cent reduction in sensitive drills became effective Aug. 1.

Sales of cranes are reported from other territories than the New York district, but conditions here remain quite as dull as for some time past. Decision has been made by the city of New York to exclude all but American builders in the bidding for the 34 cranes to be erected on the piers for the Pan American Terminal & Dock Co. being built at Stapleton, S. I. Openings on the two 3-ton portal cranes for Gowanus Canal will take place Aug. 18. Among recent sales are: Cleveland Crane & Engineering Co., a 5-ton, 50-ft. span overhead traveling crane to the Centre Iron Works, 608 East 137th Street, New York; Philip T. King, 30 Church Street, New York, a second-hand 20-ton, 40-ft. boom, 8-wheel Ohio locomotive crane with 1-cu. yd. clamshell bucket to the Brooklyn Eastern District Terminal Co., Brooklyn, N. Y. The 15-ton electric traveling crane for which the Equipment Corporation of America, Pittsburgh, has been in the market is reported to have been purchased from the Chesapeake Iron Works, Baltimore.

The Reeves Domestic Utilities Co., 50 East Forty-second Street, New York, desires information on equipment for a wire goods department in a factory it expects to open in Tulsa, Okla.

The A. C. Chesley Co., Inc., 277 Rider Avenue, New York, manufacturer of fireproof doors and windows, is having plans prepared for its new two-story plant, 100 x 210 ft., on East 132nd Street, extending through to East 133rd Street. P. S. Murray, Tuckahoe, N. Y., is architect.

The Stone Mfg. Co., Brooklyn, has been incorporated with a capital of \$250,000 by W. C. H. C. and A. G. Stone, Brooklyn, to manufacture loading and unloading machinery and kindred equipment. It is represented by F. V. Winters, 1133 Broadway.

The Typo Re-Inker Co., New York, has been chartered under State laws to manufacture inking machines and parts. The incorporators are J. F. Markey, A. K. Dohrmann, and G. F. Allison, 115 Broadway.

The only business of importance is coming from vocational schools. The Alliance, Ohio, board of education has bought 14 tools—eight lathes, two drills, two grinders, a shaper and a hack saw. No action has been taken on the 25 tools required for the Canton, Ohio, schools, bids for which went in on July 29.

The Japanese Government has bought a few lathes at Cincinnati. The International Nickel Co. is in the market for some special machinery for its new plant at Huntington, W. Va. Otherwise the Cincinnati market is extremely dull.

The Phoenix Metal Stamping Co., Philadelphia, is in the market for new or used power punch presses, a rumbler and an electric welder.

A new two-story power house, 52 x 68 ft., will be erected by the Artistic Dyeing Co., 100 Jewel Street, Brooklyn, at Moultrie and Meserole avenues. Plans have been completed.

The I. B. Kleinert Rubber Co., 725 Broadway, New York, manufacturer of rubber specialties, has awarded a contract to the White Construction Co., 95 Madison Avenue, for a four-story and basement plant, at Fifth Avenue and Eighteenth Street, College Point, L. I., to cost about \$150,000, including machinery.

The Lake Champlain Pulp & Paper Corporation, Plattsburgh, N. Y., has been incorporated with a capital of \$200,000 to manufacture pulp and paper products. The principal incorporator is Thomson Douglas, 4 Elk Street, Albany, N. Y.

The Croton Development Co., New York, has been chartered under State laws to manufacture power machinery and parts. The incorporators are H. R. McKenzie, A. M. Barbe and E. M. Davidson. It is represented by Miller, Bretzfelder & Ruskay, 302 Broadway.

Special machinery, transmission equipment, electric motors and other electrical machinery will be installed in the new four-story plant, 198 x 204 ft., to be erected by the P. Lorillard Co., 119 West Fortieth Street, New York, tobacco manufacturer, at Avenue A and Seventy-first Street, estimated to cost about \$500,000, with equipment. Ground will be broken at once.

The Amory Garage & Auto Repair Co., New Brunswick, N. J., has been incorporated with a capital of \$125,000 by William Goodwin and Klemmer Kalteissen, 101 Albany Street, to operate a machine and repair works, parts manufacture, etc.

The Kennedy Valve Mfg. Co., 95 John Street, New York, manufacturer of valves and other steam specialties, with plant at Elmira, N. Y., has acquired the factory of the Ellis-Smith Mfg. Co., Elmira, manufacturer of automobile jacks, etc., as an extension to its plant for the production of malleable iron castings.

The Beacon Lighting Fixture Co., New York, has been chartered under State laws to manufacture electric and gas fixtures. The incorporators are L. E. McMahon and E. A. Reilly. It is represented by O'Brien, Malevinsky & Driscoll, 1482 Broadway.

The Fordham Plaza Auto Co., Inc., 1856 Bath Avenue, Brooklyn, is having plans prepared for its three-story and basement automobile service and repair works, 100 x 155 ft., on Webster Avenue, New York, estimated to cost about \$150,000. Charles W. Clark, 441 Tremont Avenue, New York, is architect.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has rejected all bids recently received for electrical equipment for the electrification of a

section of its line in the anthracite district of Pennsylvania. It is expected to advertise for new bids at an early date. Gibbs & Hill, Pennsylvania Terminal, are consulting engineers.

The Blueblaze Motor Specialties Corporation, Long Island City, N. Y., manufacturer of automobile equipment, has leased the two-story building on Seventh Avenue, near Webster Avenue, for the establishment of a new plant.

The A. L. Nichols Mfg. Corporation, Poughkeepsie, N. Y., has been incorporated with an active capital of \$50,000 by J. W. Allgaze and C. F. Malcolm, Poughkeepsie, to manufacture electrical products. It is represented by F. E. Hamilton, 61 Broadway, New York.

Charles F. Rattigan, superintendent of State prisons, Capitol Building, Albany, N. Y., will receive bids until 2 p. m., Aug. 16, for the erection of an addition to the power house at Sing Sing Prison, Ossining, N. Y. L. F. Pilcher, Capitol Building, Albany, is architect.

L. H. Redner, 200 West Seventy-first Street, New York, is taking bids for a two and three-story automobile service and repair works, on West Sixty-ninth Street, estimated to cost about \$125,000. Charles B. Meyers, 31 Union Square, is architect.

The Radio Corporation of America, Woolworth Building, New York, will build a new wireless plant at Warsaw, Poland, to cost about \$3,000,000. The station will consist of 10 steel towers, each 400 ft. high, and the transmitting aerial lines will be about two miles in length. The Polish Government is interested in the project.

The Tidal Osage Oil Co., 11 Broadway, New York, a subsidiary of the Tide Water Oil Co., same address, operating oil refineries, has arranged for a bond issue of \$3,500,000, for extensions, betterments, general operations, etc.

The United Oil Producers Corporation, 347 Madison Avenue, New York, a subsidiary of the Middle States Oil Corporation and the Imperial Oil Corporation, same address, has disposed of a bond issue of \$4,000,000, for extensions, improvements and general operations of oil refineries, etc.

The Kearny Foundry Co., Kearny, N. J., has been incorporated with a capital of \$25,000 by Robert Douglas, William Baskerville and Colin D. Matier, Kearny, to manufacture iron and other metal castings. Clyde D. Souter, 31 Clinton Street, Newark, N. J., represents the company.

L. Cohn & Sons, 101 East Twenty-first Street, Bayonne, N. J., ship chandlers, have had plans prepared for a new one-story building, 100 x 125 ft., at Richmond Terrace and Lafayette Street, Port Richmond, S. I. Bids will be asked at an early date.

The Ferguson Co., Millville, N. J., has construction under way on a new plant at North Millville, for the manufacture of automobile springs and kindred products. It is proposed to commence production early in the fall.

The North Jersey Steel Co., Rockaway, N. J., will install equipment at once in its new mill, and proposes to have the plant ready for service early in the fall. The present small mill will be dismantled, and the machinery removed to the new works.

Reorganization plans are being arranged for the Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., manufacturer of automobile tires, now being operated under a receivership. While the plant has been placed on the market, it is said that future arrangements will be made for a resumption of manufacture. John P. Kirkpatrick is receiver. C. O. Corry is superintendent at the plant.

The Standard Underground Cable Co., Washington Street, Perth Amboy, N. J., has made application to the Board of Aldermen for permission to extend the railroad trackage at its works, as a preliminary to the enlargement of the plant. Plans are now being developed for extensions in a number of buildings, to provide about 100,000 sq. ft. of additional floor space. The main cable plant will be increased in height from two to three stories. The entire project is estimated to cost close to \$250,000, including equipment. C. C. Baldwin, vice-president, is in charge.

The Magna Metal Corporation, 227 High Street, Newark, has acquired about eight acres at Port Newark for the erection of a new factory. Plans will be prepared at an early date.

The American Bit Co., 55 New Jersey Railroad Avenue, Newark, has filed notice of organization, to manufacture bits and other hardware products. Edward Scherrek, 126 South Parkway, and Harry Scherrek, 122 South Parkway, both East Orange, head the company.

The Campbell Foundry Co., Millville, N. J., has completed plans and will break ground at once for a new one-story foundry at East Millville for the manufacture of iron castings.

Freight-handling machinery, including cranes, conveying equipment, etc., will be installed on the three piers to be constructed at Port Newark, Newark, by the Bureau of Docks.

The structures each will be 200 ft. wide and 1200 ft. long, and will be part of a program, costing over \$5,000,000. Arthur J. Simpson is engineer.

The Universal Stamp Works, Inc., Newark, has been incorporated with a capital of \$100,000 by Elmer J. Herman, and John H. Van Court, 252 Market Street, to manufacture metal specialties.

Robert J. Metzler, Inc., Newark, has been incorporated with a capital of \$100,000 by Samuel Kaufman, A. MacMillan, and Robert J. Metzler, 165 Park Avenue, East Orange, to manufacture machinery and parts.

The John S. Norton Co., 70 Hudson Street, Jersey City, N. J., metal products, has completed plans for a new one-story building, 50 x 100 ft., to cost about \$17,000.

## New England

Boston, Aug. 8.

The local machine tool market, which a week ago was more active than in several previous weeks, has suffered a relapse. Sales, which have been few, included a profiling machine to the United Shoe Machinery Corporation, Boston; a 2½-ft. radial drill to the Eastern Mfg. Co., South Brewer, Me., and a 12-in. x 6-ft. lathe and 21-in. drill to a Winthrop, Mass., garage. The J. Spaulding & Sons Co., Inc., Manchester, N. H., fibre counters, is in the market for one 16-in. and one 20-in. shaper, December or January delivery, and for one 16-in. x 8-ft. and one 14-in. x 8-ft. lathe for its new Tonawanda, N. Y., plant. Several prospects considered good and included in those reported last week are still under negotiation. One Western manufacturer of drills has issued a new price list showing slight declines on some equipment, no change in others, and an advance of \$15 on at least one tool, while a maker of drilling and of horizontal boring and milling machines has cut prices 10 per cent. Lower prices, however, have been named recently on prospective business.

At the auction sale of the equipment of the Industrial Research Corporation, New Haven, Conn., Aug. 4, comparatively few buyers attended. The machines went slowly and generally at new low prices for the year. Practically half the tools were as good as new, having been installed in the plant last winter and operated from then until late in April only, when operations ceased. Of the industrial interests represented at the sale, the local gas company, the Somerville Mfg. Co., Somerville, Conn., the National Woodworking Machinery Corporation, Dover, N. H., and Johnson & Bassett, Worcester, Mass., machinists, were the largest buyers. Dealers from Pawtucket and Providence, R. I., and from Bridgeport and Hartford, Conn., took considerable equipment. Some tools were purchased for a California interest, and a New York concern bought a large press.

Two Reed-Prentice high-speed ball bearing sensitive drills sold for \$50 each, and two Myers 14-in. sensitive drills at the same price. Johnson & Bassett, Worcester, purchased a 20-in. Barnes camel back upright drill, built within two years, at \$90. A 22-in. Barnes upright drill was bid in at \$130 for the California interest, the highest price paid for any drill offered. A five-spindle Taylor & Fenn high-speed sensitive drill went to a Hartford, Conn., interest at \$80. A Myers No. 1 upright bench sensitive drill sold for \$17.50, and a similar machine at \$20, the latter to the New Haven gas company.

The National Woodworking Machinery Co. bought a Brown & Sharpe No. 3 universal cutter and reamer grinding machine for \$105, while a Hartford interest paid \$200 for a No. 103 Rivett internal cylindrical grinder. Other grinding machines sold at very low prices. For instance, a Pratt & Whitney contour cutter grinder went for \$65; a J. G. Blount wet tool grinder, \$35; a No. 10 Builders Iron Foundry, \$15; a Browne & Sharpe No. 2 type automatic surface grinder, \$125; a Myers bench double grinder, \$15, and two others at \$20. A United States Electric Tool Co. portable electric tool post sold for \$12.50 and a Universal automatic face grinder, \$25.

The Somerville Mfg. Co. paid \$862 for a No. 2 Cincinnati miller, which cost the Industrial Research Corporation \$1,600 last January. J. E. Conant & Co., about seven months ago, sold a similar machine, not in as good condition, however, for \$1,890. A No. 1½ American plain milling machine brought \$300; No. 2 Brown & Sharpe plain miller \$362.50 and a No. 13 Pratt & Whitney Co. Lincoln type, extra size and extra heavy miller \$200, the latter going to the Pacific Coast interest. The same company took a No. 3 Brown & Sharpe universal milling machine at \$500, which cost the New Haven concern \$950 f.o.b. shipping point. A Pratt & Whitney full automatic thread miller went for \$20 and a similar machine for \$25, while a Pratt & Whitney 4-in. automatic spline miller brought \$30. A No. 2½ Fox knee type plain miller sold for \$55, another for \$35 and two others to



one company for \$30 each. A Pawtucket, R. I., dealer paid \$45 for a Utility milling appliance and dividing head, which recently was quoted at better than \$200 in the open market.

The highest price paid for a lathe was \$412.50 by the Somerville Mfg. Co., which was a 21-in. x 11-ft. Waterville Iron Works Roulsted, costing the company \$1,200. A heavy type 22-in. x 11-ft. Reed screw cutting engine lathe sold at \$287.50 and a 19-in. x 9-ft. machine made by the same concern at \$237.50, while two 10-in. x 4-ft. Seneca Falls Star lathes brought \$135 each, a Bridgeport interest taking one and a New Haven the other. The two latter lathes cost the company \$235 each. A 16-in. x 6 ft. South Bend sold for \$135, and a 15-in. x 6-ft. \$300; while \$45 was the best bid for a 14-in. Reed stud lathe, \$20 each for two 13-in. x 6-ft. Pratt & Whitney plain turning lathes, \$70 for a No. 3½ Stark precision bench, and \$30 for a G. Boley watchmaker's 4 x 14-in. lathe.

A Steptoe crank shaper with a 20-in. stroke was taken at \$97.50; Gould & Eberhardt gear-crank shaper with a 24-in. swing, \$137.50; three Pratt & Whitney shaving machines, \$12.50 each; an M. A. Co. heavy-type vertical swinging straightening press, \$25; two No. 2 B Cochrane-Bly cold saws, \$25 and \$30, and the New York manufacturer paid \$950 for a 400-ton Woods hydraulic press with pump equipment, sold subject to the court's order, which cost the company \$3,600 to install. The local gas company bought a Steward standard No. 0 muffle gas furnace connected with a pressure plower and bench, anvil, galvanized iron bench 80 x 28 x 34-in., a model 162 Bristol electric pyrometer, together with other hardening furnace equipment, all for \$40.

A Chisholm-Moore Cyclone one-ton chain hoist sold at \$20, four new Boyer pneumatic hammers at \$19 for the lot, and five No. 5 Parker mechanics' vises, \$4 each. Spring chucks sold at the rate of \$5 per dozen and less, speed drills for a few cents each, some as low as 5c. and high-speed milling cutters 10c. each and less.

The Chapman Valve Co., Springfield, Mass., recently purchased a 60-in. sand blast barrel weighing more than 12 tons for its new foundry.

The McKinnon Vacuum Trolley Harp Co., Holyoke, Mass., has been granted a Massachusetts charter to manufacture mechanical equipment. Allan McKinnon, 279 Walnut Street, Holyoke, is president, and Henry E. McElwain, 209 Linden Street, Holyoke, treasurer.

Contract has been awarded for the erection of a two-story U-shaped plant, 60 x 200 ft., by the Ansonia Electric Co., Ansonia, Conn.

A contract has been let by the Boston & Maine Railroad Co. for the erection of a roundhouse containing 28 stalls, and other buildings, at Concord, N. H.

The Stanley Works, New Britain, Conn., has incorporated a part of its rule making plant under the name Upson Rule Co., with an authorized capital of \$50,000 divided into 2000 shares, par \$25. C. F. Bennett is president.

The Wallace Barnes Co., Bristol, Conn., special screw machine products, flat and wire springs, etc., in the near future will open a Canadian manufacturing plant. Treuman B. Norton will be plant superintendent and Eric E. Waldo his assistant.

The American Grinder Co. division, Greenfield Tap and Die Corporation, Greenfield, Mass., is being moved from Worcester to the latter city. According to present plans, the grinder company will be housed in a plant in close proximity to the Greenfield company, the two divisions to be operated as separate units and not consolidated, as originally planned.

The Connecticut Rubber Co., Hartford, Conn., has bought the Slade Co. plant, Oakville, Conn., in which automobile tire tubes and tube protectors will be manufactured.

The Bell Tone Mfg. Co., Bridgeport, Conn., has been incorporated with a capital of \$250,000 by Charles Gardner, T. R. Adkins, and Frank Dieli, 40 Court Street, to manufacture automotive equipment and other products.

The J. D. Crosby Co., Pawtucket, R. I., is perfecting plans for rebuilding its steel fabricating plant, recently destroyed by fire with loss in excess of \$50,000. The work will include a new machine shop and annealing plant.

The Richard H. Long Co., Framingham, Mass., has filed plans for the construction of a two-story, reinforced-concrete plant on property recently acquired on Millbrook Street, Worcester, Mass., for the manufacture of automobile bodies and other automotive equipment, estimated to cost about \$65,000. Plans have also been filed for a one-story power house.

The Director of Public Works, New Haven, Conn., will receive bids until 10 a.m., Aug. 15, for center bearings, track segments, bogie wheels and other mechanical equipment for the Ferry Street bridge over the Quinnipiac River. E. S. Nettleton is city engineer.

The Builders' Iron & Steel Co., Garvey Street, Everett,

Mass., has filed plans for a new one-story factory to cost about \$65,000. A one-story storage building will also be constructed. Contract for erection was awarded recently to the Blake & Pope Co., 15 Beacon Street, Boston.

The Chapman Valve Co., Indian Orchard, Mass., has had plans prepared for a one-story addition to cost about \$15,000, supplementing the new foundry now in course of construction. The Associated Architectural & Engineering Co., 145 State Street, Springfield, Mass., is architect.

Plans are under way for a merger of the Fisk Rubber Co., Chicopee, Mass., with the Federal Rubber Co., Cudahy, Wis., and its subsidiary organization, the Ninigret Co., all devoted to the manufacture of automobile tires and tubes. The property will be taken over in the Fisk company name, and a bond issue of \$10,000,000 to carry out the consolidation is being arranged.

A one-story power house and boiler plant to cost \$60,000 will be erected by the Cambridge Gas Light Co., Cambridge, Mass.

## Chicago

CHICAGO, Aug. 8.

While formal orders for the machine tools recently selected by the Illinois Central have not been issued from the purchasing department of that railroad, this is believed to be merely a matter of routine and orders are expected shortly. There is nothing else of importance in the market. Sales are few and confined almost wholly to single machines and few of these. Inquiries are likewise scarce. None of the business which has been pending for some weeks or months seems to show any promising signs of life.

Reports from machine-tool manufacturing centers, such as Cincinnati and Rockford, Ill., indicate an almost complete shut-down of machine tool plants. In some factories even the foremen have been discharged and there is nothing to indicate when operations may be resumed. Most machine-tool plants have fairly good stocks on hand and these will have to be absorbed before production of more tools is begun.

Prices remain unchanged, except that concessions have been made on special transactions, such as the Illinois Central purchases. The question of price is regarded with seeming indifference by most of the local dealers because of the belief that even substantial reductions would not be effective now in bringing out any business.

The Northern Boiler & Iron Works is a new industry at Houghton, Mich. The plant is being started by King Brothers, formerly of Marquette, Mich. It will make a specialty of boiler repairing and acetylene welding.

Hale Dunham has purchased the interest of his partner in the Nash garage at Fond du Lac, Wis., and intends installing machines for garage repair work.

The Ampco Metal Products Co., Springfield, Ill., has completed the erection of its initial factory and has begun the manufacture of brass and aluminum castings. The building cost about \$40,000. B. F. Hayden is president. Later a complete machine shop will be erected and equipped.

The United States Lock Nut Corporation, 400 North Michigan Avenue, Chicago, has increased its capital stock from \$1,000,000 to \$2,000,000 for the purpose of providing funds for the erection of a new plant, probably in the Pittsburgh district. Present plans provide for starting work about Jan. 1. The plant will cost about \$500,000 and will be equipped with special nut making machinery, mostly of the company's own design.

The Champion Wrench Mfg. Co., 928 West Huron Street, Chicago, has increased its capital stock from \$50,000 to \$200,000 to provide for the purchase of new special machinery for wrench manufacture.

The Machinery & Supply Corporation, Joplin, Mo., has completed a new plant in that city for rebuilding second-hand machinery. Some time ago it bought the United Iron Works, Inc., Joplin. D. C. Morrow, Kansas City, Mo., is president. Offices of the company are at 317½ Joplin Street, Joplin.

The Standard Safety Equipment Co., 168 North Michigan Avenue, Chicago, has recently been organized to manufacture standard safety equipment and supplies. C. A. Kingsbury is president; F. L. Hurlbutt, treasurer, and L. E. Dickson, secretary. An Eastern office in the Clinton Building, Newark, N. J., with A. U. Barnes as manager, and a Detroit office at 414 Grand River Avenue, that city, have been opened.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, manufacturer of sheet metal products, etc., has rejected bids for its two-story addition, 50 x 80 ft., and will call for new bids on revised plans. Dubin & Eisenberg, 139 North Clark Street, Chicago, are architects.

The Marquette Electric Co., 222 Austin Street, Chicago, manufacturer of electrical specialties, has filed plans for a new factory at 1401 Center Street, to cost about \$40,000.

The Owens Motor Sales Co., 713 University Avenue, St. Paul, Minn., has rejected bids for the addition to its service building and repair works, estimated to cost close to \$100,000. New bids will be asked at a later date. Toltz, King & Day, 1410 Pioneer Building, are architects.

The American Tar Products Co., 208 South LaSalle Street, Chicago, is having plans prepared for the construction of a new refinery at Thirty-ninth Street and Fifty-second Avenue, one and two-stories, estimated to cost in excess of \$500,000, with machinery.

The H. McFarlane Co., 532 South Canal Street, Chicago, manufacturer of wagons and parts, has awarded a contract to the Adams Construction Co., 111 West Washington Street, for its new three-story and basement plant on Green Street, estimated to cost about \$400,000, with machinery. J. L. McConnell, 105 West Monroe Street, is architect and engineer. H. F. McFarlane is president.

## Philadelphia

PHILADELPHIA, Aug. 8.

The Hurley Motor Co., Broad and Race streets, Philadelphia, has filed plans for a new 10-story manufacturing plant at 219 North Broad Street, reinforced concrete, 80 x 100 ft., estimated to cost about \$350,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, will use its Essington Works, near Philadelphia, for the manufacture of a large part of the electrical machinery and equipment for the Midi Railway, France, order for which, totaling \$1,200,000, was recently received.

The Silencer Mfg. Co., Philadelphia, is being organized by Theodore F. Rose, Jr., John H. Moran and John J. Baker, to manufacture telephone attachments and other mechanical devices. It is represented by John Weaver, Commercial Trust Building. Application for a State charter will be made on Aug. 18.

The Perfection Auto Specialty Co., Philadelphia, has been incorporated under Delaware laws with capital of \$100,000 by Frederick Weirman, Charles A. Pierce, Philadelphia, and W. Hallam, Jr., Phoenixville, Pa., to manufacture automobile equipment. The company is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

The Philadelphia Automobile Lamp & Radiator Repair Co., 1304 Callowhill Street, Philadelphia, is completing plans and will soon take bids for a new three-story works, 16 x 95 ft., at 1329 Poplar Street, to cost about \$30,000.

John Evans' Sons, Inc., Philadelphia, is being organized by William, John H. and Robert Evans, to manufacture iron and steel products. It is represented by Edward J. Gallagher, Jr., 405 Lincoln Building. Application for a State charter will be made on Aug. 20.

The Bush Hill Electric & Supply Co., Philadelphia, has been incorporated under Delaware laws with capital of \$50,000 by Walter M. Fixter, Robert B. Yohey and Walter F. Secules, Philadelphia, to manufacture electrical fixtures and supplies. It is represented by the American Guaranty & Trust Co., Philadelphia.

The Biddle-Crane Motor Car Co., Philadelphia, has been incorporated with a capital of \$600,000 under Delaware laws to manufacture automobiles. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington, Del.

The Progressive Tile & Cement Works, Pottsville, Pa., is planning for the construction of a new branch plant at Hazleton, Pa.

Herman Olden, 1455 Broadway, Camden, N. J., has preliminary plans under way for a new one-story foundry, 60 x 100 ft., and estimated to cost \$30,000.

The Delaware, Lackawanna & Western Railroad Co., coal mining department, Scranton, Pa., has awarded a contract to the Industrial Construction Co., 514 Union National Bank Building, for the erection of a new machine and forge shop at its Storrs Colliery, one-story, 50 x 200 ft., and estimated to cost about \$60,000. It will also build a one-story addition to its coal-washing plant at this point to cost about \$35,000. A new electric power station and hoisting engine house will be constructed at the Bellevue colliery.

The Board of Education, Camden, N. J., will receive bids until 2 p. m. Aug. 22 for equipment for machine and forge shops, sheet metal shop, foundry and wood-working shops. Specifications may be had upon application to the board, City Hall, Camden.

Leroy A. Goodwin, P. A. Stewart and J. L. Blandy, members of the board of directors of the Chamber of Commerce, Gloucester City, N. J., are interested in the establishment of a plant for the manufacture of news-print paper, utilizing the former buildings of the Argo Mills, manufacturer of textile products. A company capitalized at \$1,000,000 is being formed by Frank J. Hummel, owner of the mill property,

and associates. A list of machinery has been arranged, and it is proposed to have the plant ready for service by the end of the year.

## Pittsburgh

PITTSBURGH, Aug. 8.

Machine tool inquiry generally is better, but manufacturers in their eagerness to secure orders practically are allowing buyers to name their own figures and the latter, fearing they will not buy at the bottom, are very slow to close. It is said that a salesman who recently called at a plant where some new equipment was necessary, on account of an order just booked, named a price of \$18,000 on the tools wanted and following a meeting of the officers of the company was told that the price was too high. The salesman asked the prospective buyers to name what they considered a fair price and \$15,000 was mentioned. The salesman then sought to get the order immediately and lopped off \$1,000 from the price the buyers were willing to pay. He was instructed to call the next morning for his answer and was then told that it had been decided to postpone the purchase for a time. Some makers of machine tools who have not announced price cuts recently have offered to take 10 per cent off for cash. There is little business in cranes, the only award recently made being a 10-ton overhead by the Greenville Steel Car Co., Greenville, Pa., to the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The original inquiry for this crane was put out almost a year ago. The Pittsburgh Bureau of Water is in the market for a 35-kw. direct current, turbo-generator unit.

The Resilient Safe Wheel Co., Inc., 121 Sixth Avenue, Pittsburgh, has acquired the plant of the American Axe & Tool Co., Glassport, for a new works. It consists of 21 buildings, on a 20-acre site, and was secured for a consideration said to be \$850,000. A number of improvements will be made and it is planned to equip the works with machinery now in the plant at Los Angeles. It is proposed to give employment to about 500 operatives, beginning production early in the coming year. The company, a Delaware corporation, recently has increased its capital from \$1,000,000 to \$3,000,000. The Glassport plant has not been in operation for about two years.

The Scientific Specialty Co., Pittsburgh, is being organized by Joseph C. Keaney, C. D. Stewart and C. L. McCobb, Pittsburgh, to manufacture light hardware products, metal kitchen utensils, etc. It is represented by C. L. McCobb, 425 Wabash Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is clearing the site for its new ice-manufacturing plant, and ground will be broken at an early date. It will be one-story, 60 x 100 ft., and is estimated to cost about \$50,000.

The Conewango Car Co., Warren, Pa., recently organized to take over the plant and business of the Allegheny Foundry Co., has completed plans for rebuilding the former Allegheny works, recently destroyed by fire, to consist of a main car works, 50 x 150 ft.; machine shop, 50 x 140 ft.; and general building, 22 x 40 ft. Construction will begin at an early date.

Fire, Aug. 3, destroyed the press mill at the plant of the duPont Powder Co., Uniontown, Pa. It will be rebuilt.

The Regent Auto Service Co., Pittsburgh, is being organized by Ernest H., Frank W. and E. R. Heinrichs to manufacture automobile parts and equipment and operate general machine works. It is represented by J. Weinman Cratty, 1412 Berger Building. Application for a State charter will be made on Aug. 29.

George Griffith, Johnstown, Pa., has completed plans and will take bids at once for a new two-story machine shop, 50 x 100 ft. H. B. Raffensperger, News Building, is architect.

The Standard Electric & Radio Corporation, Pittsburgh, is being organized by David Rose, Torrance H. Lewis and Clarence O. Fisher, Pittsburgh, to manufacture electrical equipment and radio apparatus. Benjamin P. Brasley, Bake-well Building, represents the company. Application for a State charter will be made on Aug. 22.

Material-handling and hoisting equipment, loading and unloading machinery, etc., will be installed at the new plant to be established by the H. Miller & Sons Co., Pittsburgh, building contractor. The company has purchased property at Fifth Avenue and Robinson Street, 220 x 460 ft., and 100 x 120 ft.

The E. E. White Coal Co., Glen White, W. Va., is planning for the construction of a new tippie at its properties. A one-story power house will also be constructed, with boilers equipped with automatic stokers. E. E. White is president and general manager.

The International Harvester Co. of America, Harvester Building, Chicago, has had plans prepared for a two-story and



basement addition to its building at Parkersburg, W. Va., 43 x 75 ft.

The Maryland-New River Coal Co., Winona, W. Va., will install new loading equipment, shaker screens and other mechanical apparatus at its local plant.

## Buffalo

BUFFALO, Aug. 8.

The Lamson Co., Lowell, Mass., manufacturer of pneumatic tubes, merchandise carriers and other conveying equipment, has concluded arrangements with the Chamber of Commerce, Syracuse, N. Y., for the establishment of a plant and the removal of its Lowell works to the new location. Property has been secured in the Eastwood section, and plans will be under way at an early date for the erection of a general metal-working plant, machine shops, assembling works, etc. The change in location is being made primarily for expansion purposes, and considerable new machinery will be installed. It is said that the new plant will give employment to more than 700 operatives, and is estimated to cost in excess of \$1,000,000. William F. Merrill is president. The present headquarters are at Boston.

The Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of shock absorbers and kindred products, has awarded contract to William Henrichs & Son, 193 Spring Street, for a new two-story factory, 37 x 100 ft., on West Avenue, to cost about \$40,000. Ground will be broken at once.

The Buffalo Automotive Specialty Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and parts. The incorporators are E. J. and M. H. Schork, and E. M. Allen. It is represented by T. W. Van Arsdale, attorney, Buffalo.

The Bradley Pattern Works, Inc., Buffalo, has been chartered under State laws to manufacture metal and wood patterns, and kindred products. The incorporators are J. W. Bradley, F. Leney and H. Scheibel, Buffalo. It is represented by Ferguson & Magavern, attorneys, Buffalo.

The Madison Power Co., Solsville, N. Y., has made application to the Public Service Commission for permission to build a new local electric light and power plant.

The Doman Mfg. Corporation, Elbridge, Onondaga County, N. Y., has been incorporated with a capital of \$200,000 to manufacture electrical and mechanical equipment. A. E. Doman, Elbridge, is the principal incorporator.

The Georgetown Electric Lighting Co., Georgetown, N. Y., has plans under way for a new electric light and power plant.

Joseph M. Lang, 142 Dutton Street, Buffalo, has filed plans for the erection of a sheet metal shop.

The Adria Motor Car Corporation, Cleveland, has acquired the buildings in Evans Street, Batavia, formerly occupied by the Gray Tool & Machine Co., for a new plant.

Fire, Aug. 5, destroyed \$50,000 worth of machinery in the ice and cold storage plants of the New York Central Railroad, Babcock and William streets, Buffalo.

George C. Riley, 714 Ellicott Square, Buffalo, represents the newly organized Memorial Highway Tire Corporation which has incorporated with a capital of \$25,000. It will manufacture automobile accessories.

## Cleveland

CLEVELAND, Aug. 8.

Activity in the machinery market is largely confined to purchases by schools. During the week the Board of Education, Alliance, Ohio, placed an order for equipment covered in a list of 14 machines sent out several weeks ago, which included eight lathes, two drilling machines, two grinding machines, a shaper and hack saw. One local dealer took seven machines and other local houses took the remainder. The Canton, Ohio, Board of Education has taken no action on its list of 25 machines, for which bids were received July 29. A few machines were purchased the past week for a vocational school in Marion, Ohio and it is reported that these were placed directly with manufacturers at very low prices. An order for two 24-in. lathes was placed by the Arctic Ice Machine Co., Canton, Ohio. Dealers report quite a few sales in single machines, largely second-hand. As a whole, the demand is about the same as during the past few weeks.

There is increasing evidence of price cutting and some dealers look for further reductions within the next few weeks, particularly on some of the larger types of machines. An Eastern builder has announced a reduction of 10 per cent for a 30 day period on his line of 27 to 60-in. lathes. Considerable rebuilt machinery is being offered at apparently attractive prices by machine tool builders who have surplus machinery of various types in their plants and are furnishing employment for their men in rebuilding these machines for

sale. Local foundries show no change in operations, now running on an average of about 25 per cent capacity or about the same as for the past 60 days.

The Cleveland Cold Drawn Steel Co., organized some time ago to establish a plant for the manufacture of cold drawn steel, has decided to select a site in some other city and is considering the erection of its plant in Chester, W. Va., across the river from East Liverpool, Ohio. However, the final selection of this site depends upon financial assistance to be offered by Chester. Frank B. Kew of East Liverpool, formerly superintendent of the cold drawn steel department of the Crucible Steel Co.'s plant at Midland, is temporary president of the company.

The Massillon Wire Basket Co., Massillon, Ohio, has purchased the business and equipment of the Scio Wire Crate Co., Scio, Ohio, which it will remove to Massillon.

The Canton Oxygen Co., Canton, Ohio, will shortly begin the erection of a plant for the manufacture of oxygen, involving an expenditure of \$50,000 or more for building and equipment. It has a capital stock of \$250,000. William L. Stolzenbach and others are interested.

The Canton Metal Products Corporation, Canton, Ohio, has taken an order for steel doors, door frames and other steel building material for inside finish for the new Cleveland City Hospital. The contract amounts to about \$250,000.

The Lucius Mfg. Co., Ulrichsville, Ohio, has been incorporated with a capital stock of \$150,000 by C. W. Lucius and others to manufacture welded steel tanks.

## Baltimore

BALTIMORE, Aug. 8.

The Greenmount Iron Mfg. Co., 833 Greenmount Avenue, Baltimore, has had revised plans prepared for its foundry addition to cost about \$15,000, and will call for construction bids at an early date.

The Department of the Interior, Washington, F. M. Goodwin, assistant secretary, will receive bids until 2 p. m., Aug. 18, for four sets of stokers for installation at the Freedman's Hospital power plant, Washington. Plans and specifications are on file at the office of the chief clerk of the department.

The Brosvik Sales Co., Inc., 418 East Clement Street, Baltimore, has been incorporated with a capital of \$100,000 by Bertel B. Brosvik, Arthur Fredericks and Leo Connor, to manufacture can openers, nippers, wrenches, and other metal products.

The Bogdan Cushion Wheel Hub Co., Wilmington, Del., has been incorporated with a capital of \$1,200,000 to manufacture special wheel hubs and kindred parts for automotive service. It is represented by Arley B. Magee, 33 South State Street, Dover, Del.

The Vitalis Products Co., Wilmington, Del., has been incorporated under State laws with a capital of \$13,000,000 to manufacture electric storage batteries and other electrical equipment. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington.

The Hampton Roads Equipment Co., 251 Arcade Building, Norfolk, Va., has been incorporated with a capital of \$150,000 to manufacture road-building machinery, contractors' equipment, etc. J. M. Sherrod is president, and W. L. Duncan, secretary, treasurer and general manager.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a new power house at Alexandria, Va.

The Williston Ice Co., Williston, S. C., is planning to rebuild its ice-manufacturing and refrigerating plant, recently destroyed by fire.

The Hampton Roads Ship Repair Corporation, Norfolk, Va., has been incorporated with a capital of \$50,000 to operate a local shipbuilding and repair plant. William H. Johnson is president, and E. C. Davison, Richmond, Va., secretary.

The Common Council, Donalds, S. C., is arranging for a bond issue for the installation of a municipal electric lighting plant. B. H. Carleton, commissioner of public works, is in charge.

The Bristol Aero Co., Bristol, Va., will establish a parts manufacturing shop and repair works in connection with its new airplane hangar, to be constructed on a local site. A. E. Fuller is president, and George Furrow, secretary and general manager.

The Fitch Vending Machine Co., Buchanan, Va., has been organized with \$15,000 capital stock. The officers are J. F. Fitch, president; A. B. Land, secretary, and O. E. Obenshain, treasurer.

The Floatless Carburetor Corporation, 916 Munsey Building, Baltimore, has been incorporated with \$100,000 capital stock to manufacture automobile accessories and devices. The incorporators are F. Strattner Orem, Claude R. Hays and R. Contee Rose.

## Cincinnati

CINCINNATI, Aug. 8.

A slight improvement was noted in the machine tool market the past week but business is still at a very low point. The Maxwell Motor Car Co. bought several tools, and it is stated that further purchases will be made, as it is the intention to replace old equipment with the latest production machinery. The International Nickel Co., is in the market for several special machines for its Huntington, W. Va., plant. Some buying is also reported for the Japanese Government, a local firm booking orders for several lathes. An Eastern manufacturer of shapers is said to have reduced prices approximately 15 per cent, which will probably be met by manufacturers in this district.

The Globe Metallic Works, Gest Street, Cincinnati, manufacturer of metal specialties, has purchased property at 917 State Avenue and has plans for a new factory, 40 x 95 ft. Kunz & Beck, Cincinnati, are architects. H. M. Schau is president of the company.

The Abel Magnesia Co., Columbus, Ohio, recently incorporated with a capitalization of \$400,000, will shortly commence the erection of a plant at Cedarville, Ohio. The main structure will be 65 x 65 ft., five stories, and the dryer building 60 x 160 ft., one story. Operations are expected to begin by January. The estimated cost is \$250,000.

The Bauer Brothers Co., Springfield, Ohio, operating a foundry and manufacturing farming machinery, has been authorized to increase its capitalization from \$450,000 to \$550,000. The company has been extending its plant and enlarging its facilities for several years and further additions are in contemplation. Charles L. Bauer is president.

The Norton-Broadway Machinery Co., general machinery dealer, Cincinnati, is in the market for a rock crusher, or pulverizer and portable cement mixer; No. 4 or 5 Gates gyratory crusher; 12-in. pipe machine; 8 x 8 and 10 x 10 belt driven air compressors; 24-in. shaper; No. 60 Heald grinder; three 12-in. and 13-in. light engine lathes; 1½-in. bolt cutter; 75 hp. fire box boiler; three 16-in. x 8-ft. or 10-ft. engine lathes; punch presses; one 12-in. sand pump with vertical shaft; one 5000 and one 10,000 gal. oil tank, and one 6 or 7-ft. old style, single head vertical boring mill.

## Detroit

DETROIT, Aug. 8.

A slight improvement in the demand for tools is noted in this district. The fact that most plants, however, are operating only at part capacity gives rise to the belief that no general recovery is in sight immediately. Automotive production in Detroit is better so far this month than last.

According to officials of the new Rickenbacker Motor Co., Detroit, it has contracted with the Murphy Chair Co., Detroit, for its plant site. The company has received permission to sell \$4,000,000 worth of stock.

The Acason Motor Truck Co., Detroit, has purchased the property of the David Buick Carburetor Co., Wyandotte, Mich., and will remove its plant to that location.

The Detroit Automatic Scale Co., has moved its factory and general offices to Dayton, Ohio. It has been consolidated with the Computing Scale Co. of America, of which the Detroit concern has been a subsidiary.

The Kroff Mfg. Co., Lansing, Mich., will resume operations this month. The plant was recently damaged by fire but has been rebuilt and much of the machinery has been salvaged and is being repaired. It manufactures metal voting booths and other steel articles.

Headquarters have been opened at 5739 Michigan Avenue, Detroit, by the Hydraulic Hoist Mfg. Co., St. Paul, Minn., manufacturer of St. Paul hoists and Superior bodies. The local establishment is a factory branch and is in charge of Robert E. Kilgrove. It will handle Michigan and Ohio business.

The Northern Engineering Works, Detroit, recently sold a 15-ton traveling crane to the Kansas State University.

The Kuhlman Electric Co., Twenty-sixth Street, Bay City, Mich., manufacturer of electrical apparatus, is completing plans for a one-story addition, 50 x 80 ft., and will break ground at an early date. John C. Hewitt is president.

The Detroit Automatic Machine Co., Detroit, has been chartered under State laws to manufacture automatic screw machine products and other equipment. The incorporators are Henry Holland, Horace W. Peters and Jay L. Wells, 3616 Kirby Avenue, West.

The Campbell Mfg. & Foundry Co., Muskegon, Mich., has filed notice of change of name to the Muskegon Castings Co. It will operate with a capital of \$100,000.

The Detroit Bumper Corporation, Detroit, has been chartered under State laws to manufacture automobile bump-

ers and similar metal products. The incorporators are Henry Gardner, Charles M. Phillips and Hugo Stark, 4839 McClellan Avenue.

The Rathbun Mfg. Co., Muskegon, Mich., has been incorporated with a capital of \$25,000, to manufacture automobile equipment and appliances. The incorporators are Milo D. Rathbun, H. O. Bell and Harris E. Galpin, Muskegon.

## Indiana

INDIANAPOLIS, Aug. 8.

C. & G. Potts & Co., 816 West Washington Street, Indianapolis, Ind., manufacturers of brick-making machinery, etc., have excavation work under way for their new one-story foundry addition at Washington and Blake streets, 60 x 130 ft., estimated to cost about \$45,000. The Builders Construction Co., 540 North Meriden Street, has the contract. The company formerly was known as the C. & A. Potts Co.

Officials of the United States Automotive Co., Connersville, Ind., operating the Lexington Motor Co., for the manufacture of automobiles, have organized the Fayette Painting & Trimming Co., with capital of \$500,000, for the production of automobile bodies for the parent company. It is proposed to develop a capacity of 50 bodies per day. Frank B. Ansted is president, and Frank M. Crawford, vice-president and general manager.

The Elwood Pattern & Castings Co., Elwood, Ind., has leased buildings heretofore used by the Union Traction Co., and will remodel and improve the structures for a new foundry and pattern works. Charles P. Rush and John P. Ritchie head the company.

The Martin Parry Corporation, Indianapolis, manufacturer of commercial automobile bodies, is arranging for the establishment of new assembling plants, at Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis, Kansas City, Mo., and Newark, N. J.

The Horace F. Woods Transfer Co., 216 North Meriden Street, Indianapolis, has rejected bids for its proposed automobile service and repair works, and will call for new bids at an early date. The structure will be three-stories and basement, 61 x 100 ft., and is estimated to cost about \$80,000.

The Resistant Alloy Casting Co., Gary, Ind., has been incorporated under Delaware laws with capital of \$300,000, to manufacture iron and other metal castings. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

## The Central South

ST. LOUIS, Aug. 8.

The St. Charles Garage Co., St. Louis, has plans under way for a four-story service and repair building, 130 x 160 ft., at St. Charles and Eleventh streets, to cost about \$300,000, including equipment. N. B. Howard, Arcade Building, is architect. T. S. Kirkpatrick, 5510 Cates Avenue, is one of the heads of the company.

Fire, July 28, destroyed a portion of the works of the Joplin Iron & Metal Co., Joplin, Mo., with loss estimated at about \$25,000. It will be rebuilt.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., is having plans prepared for a new one-story locomotive repair and machine works, estimated to cost about \$150,000, with equipment. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are architects and engineers.

The Arkansas Hydroelectric Co., Boyle Building, Little Rock, Ark., will commence the immediate construction of its new hydroelectric generating plant on the Red River, to have an initial capacity of 22,000-hp. J. E. Sirrine, Greenville, S. C., is consulting engineer. E. T. Stanfield is vice-president and general manager.

The Enterprise Foundry & Machine Co., Bristol, Tenn., has acquired a local building for the establishment of a new foundry for the production of iron and steel castings. The structure will be remodeled and equipment installed at a cost of about \$45,000.

The Prest Machine Works Co., Oklahoma City, Okla., has been incorporated with a capital of \$40,000 to manufacture machinery and parts, and operate a repair works. Barr S. Prest is president.

The Henry Vogt Machine Co., Tenth Street and West Ormsby Avenue, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded a contract to the Struck Construction Co., Garden Street, for a three-story addition, 50 x 162 ft., to cost about \$60,000. Construction will begin this month.

The Common Council, Claremore, Okla., is planning for the installation of a municipal electric-lighting plant. J. M. Davis, mayor, is in charge.



## Milwaukee

MILWAUKEE, Aug. 8.

The machine-tool market continues quiet, and while developments the past week or two have been more encouraging than for at least 60 days, volume is lacking. A few orders come from scattering sources and usually specify immediate shipment. The automotive industries are the best source of new business. Inquiry is slack but gives promise of some fair buying shortly. Locomotive and car building and repair shops which have been closed are now resuming work, while those which have been running at very small capacity are enlarging forces.

The Oshkosh Tractor Co., Oshkosh, Wis., incorporated recently with a capital stock of \$2,000,000, has purchased eight acres for its proposed new works on Harrison Street. Ground will be broken Aug. 15 for a machine shop and assembling floor, 150 x 375 ft., one story, of brick and steel, to cost about \$175,000. Contracts for the substructure have been let. The architects are Auler & Jensen, Oshkosh. The new corporation takes over the entire assets, equipment and stock of the LaCrosse Tractor Co., LaCrosse, Wis., for \$850,000. A. D. Paine, 276 Main Street, Oshkosh, is president and general manager of the new corporation.

The Highway Trailer Co., Edgerton, Wis., sustained a loss of about \$30,000 by fire in its main machine shop on July 29, which was the second fire believed to be of incendiary origin within the month. On July 4 the main warehouse and storage building, 190 x 960 ft., was totally destroyed, the loss being estimated at \$260,000. The works of the Continental Axle Co., an affiliated concern, was located in the burned structure. Repairs and replacements of tools will be made immediately. James W. Menhall is president and general manager.

The Badger Excavator Co., Milwaukee, is a new corporation organized with a capital stock of \$150,000 to manufacture excavating machinery and contractors' equipment. The incorporators are Lloyd H. Draeger, 780 Fourth Street; J. Jaecle, and Hugo J. Trost, attorney, 425 East Water Street. Plans of the company will be announced fully within a short time.

The Tomahawk, Wis., Steel & Iron Works broke ground Aug. 3 for a new foundry and machine shop, on a new site, to supplant the works which was totally destroyed by fire in April. The investment will be about \$75,000. Practically all foundry and machine shop equipment will be new and orders are now being placed.

The Board of Education, Clear Lake, Wis., has engaged Edwins & Edwins, architects, 911 Northwestern Building, Minneapolis, to design a new union high school, with vocational training departments, to cost \$100,000. Bids will be taken about Sept. 1. F. E. Enderholm is secretary of the board.

The Mid-West Industrial Supply Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture shop and factory equipment, supplies and accessories. The incorporators are Joseph W. Hoffmann, R. J. Haszucia and Lewis J. Brabant, attorney, 221 Grand Avenue.

The Oliver Mfg. Co., Chicago, and the Barth Mfg. Co., Milwaukee, both manufacturing lifting jacks and other automotive accessories and malleable parts, have been consolidated under the name of the Oliver-Barth Jack Co., with factory and offices at 348 352 Milwaukee Street, Milwaukee. Interests identified with the Northwestern Malleable Iron Co., Milwaukee, acquired the Oliver company last November and now have taken over the Barth company. The officers are: President and general manager, Helmus B. Wells, secretary Northwestern Malleable Iron Co.; vice-president, William H. Oliver, Chicago; secretary and treasurer, Mackey Wells; directors, Pearson Wells, Detroit, and Frederick L. Siver, president Northwestern Malleable Iron Co.

The Automotive Machine & Tool Co., Janesville, Wis., has installed a new cylinder grinding machine and other metal-working equipment. Further purchases will be made from time to time, according to Delbert Harder, general manager.

The Star Mfg. Co., Lomira, Wis., will start work soon on the erection of a factory for the manufacture of milking machines and other farm equipment and devices. It has recently been reorganized and is marketing \$50,000 of capital stock to finance construction, equipment and manufacturing. The officers are: President, Peter Wolf; vice-president, Otto Krueger; secretary, Alois Schmidt; treasurer, L. H. Zaun; director, Thomas Purtell.

Langlade County, Wis., is erecting a building, 56 x 80 ft., on the county fair grounds at Antigo for the highway department for the repair and storage of equipment. It will be equipped with a 5-ton traveling overhead crane and miscellaneous tools. C. J. Nash is commissioner.

The Drop Head Projector Co., Fond du Lac, Wis., manufacturer of portable motion picture and stereopticon machines, has reorganized with larger capital and absorbed the

Cinematic Service Co., its foreign connection. H. R. Thompson has resigned as president and is succeeded by T. B. Earle, Edgerton, Wis. A. T. Earle has been made general manager. The plant, which was erected some time ago, is now in production. A large order for die castings has been placed with the Doehler Die Casting Co.

## California

LOS ANGELES, Aug. 2.

The American Aluminum Metal Products Co., Los Angeles, has plans under way for the construction of its new plant on property recently acquired at Burbank. It will comprise several one-story buildings and is estimated to cost in excess of \$50,000. Richard D. King, 519 Van Nuys Building, is architect.

The Pacific Shovel Co., Long Beach, Cal., has been incorporated with a capital of \$100,000 by E. J. Williams, H. E. Comstock and E. B. Yost, Long Beach, to manufacture shovels and kindred products. The company is represented by Denco & Hart, 309 Long Beach Bank Building, Long Beach.

The Angelus Sanitary Can Machine Co., Los Angeles, has awarded a contract to the Austin Co., Pacific Electric Building, for its new one and two-story, brick, steel and concrete plant, at Forty-eighth Street and Pacific Boulevard, Huntington Park, near Los Angeles.

The W. B. Bastian Mfg. Co., Los Angeles, has filed notice of organization to manufacture ranges, heaters, etc. W. B. Bastian, 2983 Leeward Avenue, heads the company.

The Southern California Edison Co., Los Angeles, has arranged for a bond issue of \$6,000,000, the proceeds to be used in connection with its proposed hydroelectric generating plants. The company has had plans prepared for a new power house at 7125 South Western Avenue, two-stories, 49 x 55 ft.

The Oil Well Equipment Co., Los Angeles, has plans under way for a new one-story plant, 50 x 80 ft., at Fiftieth Street and Santa Fe Avenue. Construction will commence at an early date. Gordon LaBarr and F. A. Noyes, 524 West Ninth Street, are architects.

## The Gulf States

BIRMINGHAM, Aug. 8.

The Panther Machine Co., Fort Worth, Tex., is planning for the erection of new works for the manufacture of castings and machined products, to include foundry for brass, bronze and aluminum castings, machine shop, welding works, and grinding department. S. Johnson, F. & M. Bank Building, is president and general manager.

The Brady Compress Co., Brady, Tex., is planning to rebuild the portion of its cotton compress plant, destroyed by fire, July 28, with loss estimated at about \$100,000, including machinery.

The Golden Star Refining Co., Mexia, Tex., is planning for the construction of a new local oil refinery, with initial output of about 5000 bbl. per day.

The Home Ice & Cold Storage Co., Austin, Tex., has preliminary plans under way for the erection of a new cold storage plant. The company has increased its capital from \$125,000 to \$175,000.

The Nu-Tex Brick & Tile Co., Tampa, Fla., has been incorporated with a capital of \$200,000 to manufacture brick, tile and kindred products. Plans are under way for the erection of new works with equipment to provide for a daily output of about 30,000 brick. W. B. Coarsey is president and general manager.

The Hardee County Power & Ice Co., Wauchula, Fla., recently organized with a capital of \$200,000, has plans under way for the erection of an electric power plant, and ice-manufacturing and cold storage plant. J. G. Fancy, Fort Meade, Fla., is president.

P. P. Vail, Jackson, Miss., and associates, are planning the erection of a new ice-manufacturing and cold storage plant to cost \$150,000.

The Hartselle Machine Co., Hartselle, Ala., is planning to rebuild the portion of its plant recently destroyed by fire with loss of about \$25,000.

Electrical equipment, transmission and operating machinery and other mechanical apparatus will be installed in the new plant to be erected by the Birmingham Flour Mills, Birmingham, Ala., to be 140 x 150 ft., and estimated to cost about \$150,000.

The Texas Dressed Beef Co., Fort Worth, will build a meat-packing plant to cost \$40,000. A. H. Boswell, H. B. Kahn and R. C. Brauer are the principal stockholders.

The Corpus Christi Light & Power Co., Corpus Christi,

Tex., plans to install a new unit and rehabilitate its electric light and power plant at a cost of about \$200,000.

According to W. J. Doyle, industrial commissioner for the Gulf Coast Lines and the Houston Belt & Terminal Co., Houston, W. M. Bancroft, sugar mill machinery manufacturer, and associates plan to build a refinery at Houston to cost \$1,250,000. A site of 20 acres has been purchased.

## Canada

TORONTO, Aug. 8.

Inquiries for various lines of equipment continue the main feature of this market. Machine-tool buying, however, is at a standstill, with only a limited number of sales in wood-working equipment. Many users are in need of tools for replacement purposes, but are not buying on account of the uncertainty of industrial conditions. Dealers, however, look for more activity in the fall as it is likely that many inquiries now in the market will ultimately turn into sales. Small tools are moving quietly. The Westinghouse Electric & Mfg. Co., Hamilton, Ont., announces a 10 per cent reduction on prices of practically all industrial motors and motor control apparatus, including all direct current generators and motor generators.

The Adanac Motor Syndicate, Lachine, Que., has been incorporated to manufacture motor trucks, etc. The head office is at 163 St. Joseph Street. The directors include Gordon A. Elmslie, H. Milton Purnell and B. H. T. McKenzie.

The general contract for the construction of a \$5,500,000 power plant at Point Du Bois, Man., for the Winnipeg Electric Railway, Winnipeg, Man., has been let to the Northern Construction Co., Union Bank Building, Winnipeg.

London, Ont., will have plans prepared for erection of pump house to cost \$50,000. H. A. Brazier is engineer.

The F. Bowden Lumber Co., Greenwood Avenue, Toronto, is preparing to build a planing mill to cost about \$60,000.

Molson's Brewery, 906 Notre Dame Street East, Montreal, has awarded the general contract for a boiler house to cost \$80,000 to E. G. M. Cape & Co., Ltd., 10 Cathcart Street, Montreal.

Belleville Motors, Ltd., Belleville, Ont., have been incorporated with a capital stock of \$40,000 by Charles E. Wilmut, Earl F. Chapman, and others to manufacture automobiles, bicycles, trucks, parts, etc.

The Canadian Automatic Boiler Cleaner Co., Ltd., Kingston, Ont., has been incorporated with a capital stock of \$50,000 by Knud Lund, Gananoque, Ont.; Francis J. Lachance, Howe Island, Ont.; John E. Kane and others of Kingston, Ont., to manufacture boilers, engines, tools, etc.

H. G. MacDonald, 612 Tegler Building, Edmonton, Alta., has the general contract for the erection of power house to cost \$40,000 for the Department of Public Works, Provincial Government, Calgary, Alta.

## Plans of New Companies

The Oilgear Co., Milwaukee, which was incorporated a short time ago to manufacture transmission devices and specialties, has increased its capital stock from \$100,000 to \$300,000 preferred stock and 25,000 shares of common stock without par value.

The McCabe Co., Inc., 119 West Freemason Street, Norfolk, Va., authorized to manufacture and sell the McCabe automatic water heater, wishes to contract with some company to manufacture for it. Its officers are: Allen E. McCabe, president and treasurer; W. L. Ewing, vice-president and general manager, and W. J. Fielder, secretary. This is a stamping job, requiring automatic stamping machinery, as the device is made of either sheet copper or brass with a small collar stamped from black iron. The company is in the market for range boilers and hot water tanks of various sizes, and wants quotations on copper and brass tubing of 4 in. and 5 in. diameter and on sheet copper or brass of 18 and 20 gage. It is also looking for a location for an assembling and shipping plant in Eastern or Central States.

The Lane Signal Accessories Co., Sayre, Pa., recently incorporated, will manufacture relays, indicators, switch boxes, lightning arrestors and other accessories to an automatic system of signals and will sell principally to the railroads. The company proposes to have its own plant to manufacture all the articles it will sell. It will equip the plant with machinery for this purpose and will be in the market for equipment, comprising automatic and hand screw machines, drill presses, milling machines, etc.

The S. P. Brick Co., recently incorporated, has been in operation for the past 10 years. The only change is that the firm has been incorporated.

## IRON AND INDUSTRIAL STOCKS

### Net Changes in Prices for the Week Are Not Significant

General sentiment in most sections of the country is more cheerful than it has been, yet this fact is not reflected in the movement of prices quoted for iron and industrial stocks the past week. Early in the week the price tendency was upward, but when call money at New York rose from  $3\frac{1}{2}$  to 6 per cent a damper was put on investment buying and prices sank back to about their level of a week ago. Thus the net change in the market value of the average security does not amount to much.

Some investors maintain securities have not discounted good business this or early next year. A comparison of securities values, however, shows that on the average they are higher than they were two, three and four months ago. The recovery has been slow, however, and not noticeable to many.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30 $\frac{1}{2}$ -32	Int. Har. com.	72 $\frac{1}{2}$ -75 $\frac{1}{2}$
Am. Can. com.	26 $\frac{3}{8}$ -28 $\frac{1}{2}$	Int. Har. pf.	99 $\frac{1}{2}$ -100 $\frac{1}{2}$
Am. Can. pf.	82	Lackawanna Stl.	39 $\frac{1}{2}$ -40
Am. C. & F. com.	124-125 $\frac{1}{2}$	Midvale Stl.	23 $\frac{1}{2}$ -24 $\frac{1}{2}$
Am. C. & F. pf.	108-109 $\frac{1}{2}$	Nat.-Acme	14 $\frac{1}{2}$ -14 $\frac{3}{4}$
Am. Loco. com.	82-85 $\frac{1}{2}$	Nat. E. & S. com.	48-48 $\frac{1}{2}$
Am. Loco. pf.	100-102 $\frac{1}{2}$	Pressed Stl. com.	58-61 $\frac{1}{2}$
Am. Stl. F. com.	25 $\frac{1}{4}$ -26	Ry Stl. Spg. com.	76-80
Bald. Loco. com.	76 $\frac{3}{8}$ -80 $\frac{1}{4}$	Replogle Stl.	20 $\frac{3}{4}$ -23
Beth. Stl. com.	48 $\frac{1}{2}$ -50 $\frac{1}{4}$	Republic com.	46 $\frac{3}{4}$ -49 $\frac{1}{4}$
Beth. Stl. Cl. B.	50-52 $\frac{3}{4}$	Republic pf.	85
Beth. Stl. 8 $\frac{1}{2}$ pf.	98 $\frac{3}{4}$ -99	Sloss com.	34 $\frac{1}{4}$ -35 $\frac{1}{2}$
Chi. Pneu. Tool.	49-50	Un. Alloy Stl.	25
Colo. Fuel	22 $\frac{3}{4}$ -23 $\frac{3}{4}$	U. S. Pipe com.	15-15 $\frac{1}{2}$
Cru. Stl. com.	54 $\frac{1}{2}$ -57 $\frac{3}{4}$	U. S. Stl. com.	74 $\frac{3}{4}$ -76
Gen. Electric	117 $\frac{1}{2}$ -120	U. S. Stl. pf.	167 $\frac{3}{4}$ -169
Gr. No. Ore Cert.	27 $\frac{1}{4}$ -28	Vanadium Stl.	29-30
Gulf States Stl.	33-36 $\frac{1}{2}$	Westingh'se Elec.	43-48 $\frac{1}{2}$

## Industrial Finances

Involuntary bankruptcy proceedings have been filed against the Shuler Axle Mfg. Co., Louisville, Ky., the petition setting forth that assets are \$250,000, with liabilities of \$385,000. The Steel Products Co., Cleveland, and two other creditors brought the action, alleging that the company had preferred other creditors, among which was the First National Bank of Louisville. Officers of the company claim that assets are tied up in material and securities which can't be liquidated at this time.

The United States Tack Co., New Bedford, Mass., has converted the 1000 outstanding shares of common stock, par \$100., into 1000 shares of no par value, and has issued 11,000 additional common shares, no par value, as well as 1000 shares 8 per cent preferred stock, par \$100. All of the preferred stock and part of the common will be offered for subscription and part of the common distributed to holders of original shares.

The Bridgeport Hydraulic Co., Bridgeport, Conn., has sold to banking interests \$1,750,000 5 per cent gold notes, dated June 1 and maturing in 1925. These notes are a part of a \$5,000,000 authorized issue.

It was announced in New York in the past week that the issue of \$5,000,000 of Otis Steel Co. first mortgage, 20-year, 8 per cent sinking fund gold bonds, put out through Blair & Co., had been taken up promptly. The purpose of these bonds is to pay off approximately \$3,500,000 current indebtedness and to provide additional working capital. It was stated that after giving effect to the proposed bond issue, current assets as of June 30, 1921, were \$8,366,189 and current liabilities \$981,845. The company's plants at Cleveland have an approximate annual capacity of 360,000 tons of pig iron, 275,000 tons of plates, 140,000 to 150,000 tons of light plates and sheets, 30,000 tons of steel castings, 10,000,000 lb. sulphate of ammonia, 3,500,000 gal. tar, 1,250,000 gal. crude benzol and toluol and 600,000 lb. sodium ferrocyanide.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., reports gross earnings for the three months, ended June 30 last, amounting to \$212,094. Interest, taxes, etc., amounted to \$111,020, thereby making the net earnings for the second quarter \$100,073, as contrasted with \$471,356 for the three months, ended March 31. Net earnings for the six months, ended June 30, were \$571,430.

The Two-In-One Signal Lamp Corporation, 152 Temple Street, New Haven, Conn., recently incorporated with a capital of \$50,000 to manufacture electrical lamps and signal devices, is having its work done by C. Cowles & Co., New Haven, Conn. The lamp takes the place of the ordinary tail light and in addition it is a signal device, operated automatically from the brake, cable reaching from the break-rod to the lamp, and the cover slides up when the brake is brought into action. The lamp is made of brass with a high lustre nickel finish.



# Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

## Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price.....	2.78c.
Swedish bars, base price.....	12.00c.
Soft steel bars, base price.....	2.78c.
Hoops, base price.....	3.88c.
Bands, base price.....	3.43c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	2.88c.
Channels, angles and tees under 3 in. x	
¼ in., base.....	2.78c.

## Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)...	2.95c.
Toe calk, ½ x ¾ in. and larger.....	3.45c.
Cold-rolled strip, soft and quarter hard.....	10.00c. to 10.50c.
Open-hearth spring steel.....	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds.....	4.38c. to 4.53c.
Squares, flats and hex.....	4.98c. to 5.03c.
Standard cast steel, base price.....	14.00c.
Extra cast steel.....	17.00c.
Special cast steel.....	22.00c.

## Tank Plates—Steel

¼ in. and heavier.....	2.88c.
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## Sheets

Blue Annealed	Per Lb.
No. 10.....	3.53c.
No. 12.....	3.58c.
No. 14.....	3.63c.
No. 16.....	3.73c.

## Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20.....	4.05c. to 4.30c.	.....
Nos. 22 and 24.....	4.10c. to 4.35c.	4.70c.
No. 26.....	4.15c. to 4.40c.	4.75c.
No. 28.....	4.25c. to 4.50c.	4.85c.
No. 30.....	4.50c. to 4.75c.	.....
No. 28, 36 in. wide, 10c. higher.		

## Galvanized

	Per Lb.
No. 14.....	4.25c.
No. 16.....	4.50c.
Nos. 18 and 20.....	4.65c.
Nos. 22 and 24.....	4.80c.
No. 26.....	4.95c.
No. 27.....	5.10c.
No. 28.....	5.25c.
No. 30.....	5.75c.
No. 28, 36 in. wide, 20c. higher.	

## Welded Pipe

Standard Steel	Wrought Iron
Blk. Galv.	Blk. Galv.
½ in. Butt.. —48 —32	¾ in. Butt.... —22 —4
¾ in. Butt.. —54 —39	1-1½ in. Butt. —24 —6
1-3 in. Butt.. —56 —42	2 in. Lap..... —14 —1
3½-6 in. Lap. —51 —37	2½-6 in. Lap. —22 —6
7-12 in. Lap.. —43 —27	7-12 in. Lap.. — 7 +4

## Steel Wire

	Per Lb.
Bright basic.....	4.25c. to 4.50c.
Annealed soft.....	4.25c. to 4.50c.
Galvanized annealed.....	5.00c. to 5.25c.
Coppered basic.....	4.75c. to 5.00c.
Tinned soft Bessemer.....	6.25c. to 6.50c.

\*Regular extras for lighter gages.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

## Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet.....	15¼c. to 18¼c.
High brass wire.....	16¼c. to 21¼c.
Brass rod.....	13¼c. to 20¼c.
Brass tube, brazed.....	27 c. to 31 c.
Brass tube, seamless.....	19 c. to 20 c.
Copper tube, seamless.....	22¼c.

## Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¼c. to 23c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

## Tin Plates

Bright Tin	Grade	Grade	Coke—14x20	Primes	Wasters
	"AAA"	"A"			
	Charcoal	Charcoal	80 lb....	\$6.80	\$6.55
	14x20	14x20	90 lb....	6.90	6.65
			100 lb....	7.00	6.75
IC..	\$10.60	\$9.50	IC..	7.20	6.95
IX..	11.80	10.75	IX..	8.10	7.85
IXX..	13.60	12.25	IXX..	9.10	8.85
IXXX..	15.60	14.25	IXXX..	10.50	10.25
IXXXX..	17.20	16.00	IXXXX..	11.50	11.25

## Terne Plates

8-lb. Coating 14 x 20

100 lb. ....	\$7.50
IC.....	7.75
IX.....	8.00
Fire door stock.....	11.00

## Tin

Straits pig.....	30c.
Bar.....	37c. to 38c.

## Copper

Lake ingot.....	15c.
Electrolytic.....	15c.
Casting.....	15c.

## Spelter and Sheet Zinc

Western spelter.....	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks.....	11¼c. open 12c.

## Lead and Solder\*

American pig lead.....	5½c.
Bar lead.....	6¼c. to 6½c.
Solder, ½ and ½ guaranteed.....	20¼c.
No. 1 solder.....	18½c.
Refined solder.....	15¼c.

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb.....	80c.
Commercial grade, per lb.....	40c.
Grade D, per lb.....	35c.

## Antimony

Asiatic.....	6½c. to 7c.
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## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	30c. to 32c.
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## Old Metals

The market is easy. Business is at a standstill. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	9.75
Copper, heavy and wire.....	9.00
Copper, light and bottoms.....	7.50
Brass, heavy.....	4.50
Brass, light.....	3.75
Heavy machine composition.....	7.75
No. 1 yellow brass turnings.....	4.00
No. 1 red brass or composition turnings.....	6.25
Lead, heavy.....	3.50
Lead, tea.....	2.00
Zinc.....	2.50

